eserve
1.9
P69P

LIBRARY
CURRENT SERIAL RECORD
☆ JAN 24 1947 ☆
U. S. DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

1592

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

Volume 31 Number 1

January 15, 1947

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station — Beltsville, Maryland
Volume 31 — January 15, 1947 — Number 1

IN THIS ISSUE

Effective control of late blight on mature green tomato fruits was obtained by Dithane dips if used soon enough after exposure to infection, according to tests reported by A. L. Harrison, page 2.

Late blight is reported on tomatoes in Pennsylvania greenhouses, by A. H. Bauer and R. S. Kirby, and on tomatoes in a greenhouse and potatoes in a field in Louisiana, by C. W. Edgerton, page 6.

Prevalence of potato late blight rot on potatoes in Maryland this year, a destructive attack of Phytophthora blight on peppers in Texas, and occurrence of corky ringspot on Washington-grown potatoes, are reported in short notes by R. A. Jehle, by G. H. Godfrey, and by G. B. Ramsey and M. A. Smith, respectively, page 7.

Earle C. Blodgett reports that black rot is an important storage disease of potatoes in Idaho, page 10.

J. M. Crall reports the presence of the undetermined brown stem rot of soybeans in Missouri, page 14.

A feature of the fall wheat leaf rust epiphytotic in Oklahoma is the prevalence of races to which the widely planted Pawnee variety is susceptible, according to K. Starr Chester and D. A. Preston, page 15.

Wheat bunt has become a serious disease in Western Nebraska, according to J. E. Livingston, page 17.

Prevalence of Verticillium wilt on cotton is reported from various States, page 19.

P. J. Anderson reports incidence of tobacco diseases in Connecticut in 1946, page 21.

Diseases and disorders affecting nut crops in Oregon are reported by P. W. Miller, page 24.

Henry E. Yost and George H. Hepting report observations on the development of white pine blister rust in an unprotected area in North Carolina, page 26.

Wood-decay fungi reported on conifers in some Western States, reported by James L. Mielke and Ross W. Davidson, page 27, include numerous new records.

Brief notes, page 31, include notes on the presence of the new Helminthosporium oat blight and root rot in Louisiana, by I. L. Forbes, and a new lily host for the black scale disease, by W. D. McClellan; and a correction.

Check list revision, by Freeman Weiss, page 33.

November weather and Autumn weather, page 53.

TESTS FOR THE CONTROL OF LATE BLIGHT ON "MATURE GREEN" TOMATO FRUITS

A. L. Harrison

During the height of the spring tomato harvesting season on the west coast of Florida, late blight caused by Phytophthora infestans was responsible for considerable financial loss to many growers. Some growers did not get cost of production out of the tomato crop.

Late blight started in the seed-beds, resulting from a carry-over from the fall crop, and was active at various times during the spring growing season. It was inactive during the first two to three weeks of the harvesting season, then it suddenly reoccurred in an active form following the wet period of weather of April 17 and 18. This recurrence was responsible for the closing of the Farmers' Auction Market at Palmetto, which is in the heart of the Manatee County tomato section. Shippers who bought tomatoes during this period lost heavily from the development of late blight in transit.

The question was repeatedly asked "Can tomato fruits be dipped in some fungicides and thus prevent the spread of late blight?" No satisfactory answer could be given. Ramsey[1] has reported that a two-minute soak in formaldehyde (1-300) will help reduce the development of late blight on tomato fruits, but not sufficiently to warrant its use.

Because of the seriousness of the situation several tests were conducted to see whether late blight could be checked on tomato fruits by dipping them in various fungicides, before and after they had been inoculated with spores of the late blight fungus either naturally or artificially.

Experimental Results.

In the first test 80 green tomato fruits were dipped on April 17 in each of the 4 following materials: Dithane plus zinc sulfate and lime 3 qts. - 1 1/2 lbs. - 3/4 lb. - 100 gal.; Copper A compound 6 - 100; He 173E (zinc ethylene bisdithiocarbamate) 3 - 100; and water. The wetting agent BI956 at the rate of 1/2 ml. per gal. was added to all dips. As soon as the fruits had dried, crocks containing them were randomized, then inoculated by sprinkling with a spore suspension of P. infestans and covered immediately with a heavy tarpaulin. Conditions were favorable for infection as showers fell frequently practi-

---

[1] Ramsey, G. B. and A. A. Bailey. Tomato late blight rot, a serious transit and market disease. U.S. Dept. Agr. Circ. 169: 1-11. 1931.

Table 1. The effect of some fungicide dips on the development of late blight on tomato fruits inoculated with spores of P. infestans and incubated for different periods of time before treatment.

Dip Treatment*	Incubation period in hrs.	Number of fruits with late blight on: 4/23	4/25	4/27	Dip Totals on 4/27
Check (Dipped in water)	67	80	80	80	
	43	80	80	80	
	19	29	79	79	
					239
Dithane, zinc sulfate and lime 3 qts: 1 1/2-3/4-100	67	77	80	80	
	43	78	80	80	
	19	0	23	27	
					187
Copper A 6-100	67	78	80	80	
	43	80	80	80	
	19	12	47	52	
					212
IN5446 3-100	67	80	80	80	
	43	79	80	80	
	19	9	48	60	
					220
He 178E 3-100	67	80	80	80	
	43	79	79	79	
	19	7	48	60	
					219
IN 7331 3-100	67	80	80	80	
	43	80	80	80	
	19	3	45	52	
					212
Phygon 1½ -100	67	78	80	80	
	43	80	80	80	
	19	8	42	50	
					210

* The wetting agent BI956 was added to each dip at the rate of 2 ml. per gallon. Least difference between dip totals required for significance at 19:1 -- 12.3

cally all day and night following the inoculation. On April 25 there were 4, 5, 32 and 60 fruits with late blight in the respective treatments. This was good evidence that if the fungicides were applied before infection had taken place, Dithane and Copper A would prevent most of the development of late blight.

In the second test tomatoes were inoculated on April 17, 18 and 19, and samples from each lot were dipped in various fungicides on April 20 and stored in a cool shady place in replicated and randomized fashion in glazed crocks. There were 20 fruits in each crock with 4 crocks for each dip treatment. Records on the development of late blight were taken on April 23, 25 and 27. The data are presented in Table 1. All fungicide dips reduced the amount of late blight where the fruits had been incubated for only 19 hours. There was no beneficial effect from any dip where the fruits had been incubated for periods of 43 and 67 hours before treatment.

The data from this test demonstrated that most fruits will show signs of late blight within 4 days, but occasionally not until 7 or 8 days, after inoculation. These observations are in keeping with those of Ramsey and Bailey[2].

In the next test, which was carried on at the same time as the test reported on in Table 1, apparently sound fruits were picked from a field where 75 to 80 percent of the fruits were affected with late blight. They were picked on April 19, the day following the infection period of April 17 to 18[3]. On April 20, 100 fruits were dipped in each of the fungicides listed in Table 1 and set aside in a cool shady place. None of the dips reduced the amount of late blight. From 57 to 70 percent of the fruits were affected with late blight in the various treatments. The data from this test and those presented in Table 1 demonstrate that dips will be of little value unless used immediately after a period of late blight infection.

In the fourth experiment three lots of sound green tomatoes were inoculated with a spore suspension of P. infestans, one at 8 A.M., one at 2 P.M., and one at 8 P.M. on April 26. They were incubated in large glazed crocks in a cool shady place.

Samples from each lot were dipped the following morning in various fungicides, placed in two-gallon glazed crocks and set aside in a randomized and replicated arrangement to check on the development of late blight. The final records were taken on May 6. There were 80 fruits

---

[2] See footnote 1

[3] Harrison A. L. The relation of weather to epiphytotics of late blight on tomatoes. (In press)

708628

from each dip at each period of incubation with 20 in each replication. The data are presented in Table 2. They emphasize the fact that tomato fruits must be dipped within a few hours after inoculation if the fungicide is going to reduce the incidence of late blight in a sample of tomatoes materially. The Dithane dips were significantly better than the other fungicides used. Both Dithane dips gave almost perfect control of late blight when the fruits were incubated for only 12 hours but not so good when the fruits had been incubated for longer periods of time.

Table 2. The effect of some fungicide dips on the development of late blight in tomato fruits inoculted with P. infestans and incubated for different periods of time before dipping in various fungicides.

Dip treatment*	Number of fruits with late blight in incubation period: 24 hrs.	18 hrs.	12 hrs.	Dip treatment totals
Check	41	33	21	95
Dithane, zinc sulfate lime: 3 qts.-1 1/2-3/4-100	15	8	1	24
Dithane, zinc sulfate lime: 4 qts.-2-1-100	9	5	2	16
IN7331 4-100	15	17	15	47
Phygon 2-100	30	19	16	65
Incubation period totals	110	82	55	

* B1956 was added at the rate of 2 ml. per gal. to each dip.

Least difference between totals required for significance at 19:1

Dip totals	21.8
Incubation period totals	20.8

Summary

The tests definitely demonstrated that the fungicide dips used were of little or no value in reducing the incidence of late blight when

the fruits had been inoculated for periods longer than 24 hours prior to dipping. All dips gave some reduction when the fruits were dipped 24 hours or less after inoculation. A strong Dithane dip was significantly superior to all other dips used (Copper A, IN5446, He 178E, IN7331, and Phygon). However, if the fruits had been inoculated longer than 12 to 18 hours, Dithane failed to reduce the incidence of late blight sufficiently to be of practical value.

Both Dithane and Copper A gave fair to good control of late blight when the fruits had been dipped in these fungicides prior to inoculation, indicating that if the fruits are properly covered with spray materials in the field there will be little or no danger from loss in transit due to late blight.

VEGETABLE CROPS LABORATORY
FLORIDA AGRICULTURAL EXPERIMENT STATION
BRADENTON, FLORIDA

CURRENT REPORTS OF LATE BLIGHT ON POTATO AND TOMATO

TOMATO LATE BLIGHT IN PENNSYLVANIA GREENHOUSES

By A. H. Bauer and R. S. Kirby

Phytophthora infestans during the late fall of 1946 spread to tomato plants growing in greenhouses. Late blight has been found in greenhouses in three counties, Lawrence, Lycoming, and Jefferson. It was first found in greenhouses at Brookville on October 11. Infection has been found on leaves, stems, and fruit.

On the last trip to the commercial greenhouse in Lawrence County on December 11, infection was observed to have increased since October 23 when it was first observed there. The fungus was observed to be sporulating on the fruit on December 11. -- PENNSYLVANIA STATE COLLEGE, STATE COLLEGE, PENNSYLVANIA

EARLY OCCURRENCE OF LATE BLIGHT IN LOUISIANA

By C. W. Edgerton

In previous years in Louisiana, late blight has usually appeared in the fields in April and May, and it has been assumed that it is brought in each year on seed potatoes and that it will not live over the hot summer season. The harvesting of potatoes is finished in early June

and potatoes for the fall crop are not planted until August, and even then, until October the temperatures are too high for what has been assumed possible for the development of the late blight fungus.

Late blight, however, was found on December 12, on tomatoes in a greenhouse at Baton Rouge, and in a field of potatoes at Raceland. The fall and winter have been abnormally mild. No frosts or freezes have occurred and potato and tomato plants are still growing in the fields. During recent weeks, both the temperature and the rainfall have been ideal for the development of late blight providing the fungus were present.

The occurrence of late blight at this season indicates that the fungus may live over the summer in Louisiana in some form or other under some conditions. Late blight at this season is a serious menace to the spring crop. If the season continues favorable, spring planting should commence by the middle of January. -- LOUISIANA STATE UNIVERSITY, BATON ROUGE, LOUISIANA

SHORT REPORTS ON DISEASES OF VEGETABLE CROPS

LATE BLIGHT ROT ON POTATOES IN MARYLAND

By R. A. Jehle

Late blight rot has been found to be very prevalent on the late potato crop in all parts of Maryland excepting Garrett County. Weather conditions were very favorable for its development everywhere in the State, with rain and fog prevalent, excepting in Garrett County where there was a prolonged drought. In some cases losses were very severe and 25 to 50 percent of the tubers rotted in the field or soon after the crop was harvested. In Worcester County the loss from late blight on potatoes was estimated at 25 percent by the County Agent Mr. R. T. Grant.

When infection is severe, or where soft rot is also present, sorting out and destroying all infected tubers is recommended followed by storage of the healthy tubers in a well-ventilated place with temperatures ranging from 36 to 40 degrees F. When infection is light and soft rot is not present, tubers infected with late blight rot will dry up and cause no injury if the potatoes are kept in a well-ventilated storage house at proper temperatures. -- UNIVERSITY OF MARYLAND, COLLEGE PARK, MARYLAND. November 21

PHYTOPHTHORA BLIGHT OF PEPPERS IN SOUTH TEXAS

By G. H. Godfrey

Pepper blight caused by Phytophthora capsici Leonian appeared for the first time to a destructive extent in the Lower Rio Grande Valley of Texas in the fall of 1946. It was not called to the writer's attention until about five days after it was first observed. By this time it had killed about ten acres of the crop in an over-wet portion of the 70-acre field, and scattered infections were present throughout the balance of the field. In the same period it was also destructive in another field about 12 miles distant. A mild case of the disease had been seen by the writer four years previously. All cases were on California Wonder peppers. This report is the first from Texas.

The symptoms were typical of the disease, as described by Leonian (Phytopath. 12: 401-408. 1922). Plants with lesions low on the stem were quickly killed. Those with leaves and upper branches only affected often survived, but affected parts died. The fruits were still small and no infection was found on them.

After the most seriously affected portion of the field was disked down, the balance of the field showed about 90 percent of the plants still standing. The field was given an airplane dusting with a fixed copper dust, but at the same time there was a change to dry weather. The disease ceased its active spread, and much new growth, free from infection, occurred. A single-row Dithane spray test, with a non-sprayed row, showed in both rows some additional dying of plants from stem lesions low on the plants but no new infections. The disease had probably ceased its activity due to a change in weather conditions rather than to beneficial effects from fungicides. The Phytophthora blight of peppers, therefore, would appear to be even more restricted to excessively moist conditions than is late blight of potatoes. Tomato plants with damage from late blight stem lesions, on the other hand, have been observed in the Lower Rio Grande Valley to recover spontaneously with the advent of dry weather. -- TEXAS A. AND M. COLLEGE SUBSTATION NO. 15, WESLACO, TEXAS

CORKY RINGSPOT OF POTATOES FROM WASHINGTON

By G. B. Ramsey and M. A. Smith

Recently Eddins et al. (Amer. Potato Jour. 23: 330-333. 1946) described corky ringspot in Florida potatoes and asked for further information on the distribution of this disease in the United States.

This note is to report that the writers found this disease in Washington-grown White Rose potatoes on the Chicago market during August in 1944 and 1945. Only a few tubers were found each year but the characteristic brown circles, loops, arcs, and spots evident on the surface of the tubers and similar necrotic loops, streaks, and spots in the interior were typical of the disease called "sprain" by Atanasoff (Phytopath. 16: 711-722. 1926). Our cultures from internal necrotic areas yielded only bacteria that were believed to be nonpathogenic soil organisms. The symptoms of corky ringspot resemble more closely those produced by certain viruses in western-grown tomato fruit than any bacterial disease yet described. -- U. S. DEPARTMENT OF AGRICULTURE, MARKET PATHOLOGY LABORATORY, CHICAGO, ILLINOIS

COMMENTS ON BLACK ROT, A STORAGE DISEASE OF POTATOES IN IDAHO[1]

Earle C. Blodgett[2]

Surveys of potato cellars in Idaho during the 1943-44 season, conducted by the Emergency Plant Disease Prevention Project, U. S. Department of Agriculture, showed among other things, that a disease popularly known as black rot was widespread and in many cases very serious. Since considerable field frost was involved in the crop that season it was thought that it might be a contributing or at least a complicating factor. The surveys were continued in the 1944-45 season when in addition to the commercial storages a rather detailed examination was made of a fairly large percentage of certified seed lots throughout the State. This was done for seed lots in most cases during March, April, and May when they were being sorted. The importance of black rot as a storage disease was again demonstrated, perhaps even more conclusively than the year before as practically no field frost occurred on the 1944 crop. Largely because of the information from these surveys it has been concluded that black rot is the principal storage rot of potatoes in Idaho on both commercial and certified seed. Some of the factors brought out by the survey are discussed here.

Symptoms of Black Rot

Typically, in the Russet Burbank variety, black rot is characterized by a moist, firm, black discoloration of tissue beneath an injury, frequently a broken-off knob or a digger cut. The rot may start anywhere on the tuber but principally through injuries. The rotted area is only slightly sunken but the extent of the decay cannot be judged from the surface. Internally the rot extends in long blotches or pockets into the center or breaks out to the opposite surface. In scalded tubers the developing rot is most commonly black rot and is characteristically wet if on the bud end or on immature tubers. The color of black rot varies from a brownish-yellow through dark-brown to a coal black. Apparently the color variation is influenced to some extent by the temperature and rapidity of spread in a tuber and to some extent by multiple infections. In Chippewa and similar varieties the rot tends to be much more of a dry rot with a brown color and compares closely to the description furnished by Cassell (2). On the surface of infected tubers in late storage, especially if the humidity is high,

---

[1]Work done under Emergency Plant Disease Prevention Project in cooperation with the Idaho Agricultural Experiment Station

[2]Formerly Pathologist, Emergency Plant Disease Prevention Project, U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering. Now Associate Pathologist, Irrigation Branch Station, State Agricultural Experiment Station, Prosser, Washington

appear masses of fungus growth with a black, blue, or violet color. They appear much like Rhizoctonia sclerotia but are in reality sporodochia. Affected tubers are usually a total loss because the rot cannot be eliminated by clipping. In fact, black rot has been the most common cause of lot rejections by the Inspectors and it is often involved in grade reversals when No. 2 and utility potatoes are not shipped promptly.

Cause of Black Rot

The cause of black rot is at present regarded as a "complex" involving Fusarium spp. According to Dykstra (4), F. coeruleum and F. trichothecioides are the principal causes of dry rot, the latter producing a powdery dry rot. Link and Ramsey (5) state that F. radicicola "induces a black field rot in Idaho and contributes to jelly end rot of the Burbank variety in the irrigated sections of the Far West". The writer found no association with a black field rot and only in rare cases with jelly end.

Dr. W. W. Ray, Mycologist of the Emergency Plant Disease Prevention Project, at Oklahoma A. & M. College, isolated from dozens of potatoes sent him by the writer from the Idaho material. The most consistently isolated fungus was F. sambucinum f. 6, while F. coeruleum was present in many cases.

It would therefore appear likely from this evidence that F. sambucinum f. 6, as also noted by Cassell (2) and by Cunningham and Reinking (3), is the principal Fusarium involved in black rot. The presence of multiple infections seems very probable and might account for certain variations in symptoms.

Association With Black Leg

During the winter season of 1943-44 Dr. James Kraus, while tuber-indexing potatoes in the greenhouse, called the writer's attention to the severe loss of tubers from black rot when the disease affected the wound from which the eye was taken. Dr. Ray isolated Fusarium spp. from samples of these tubers. Later, the lots of indexed tubers were planted as foundation stock and attempts were made to eliminate the rotted tissue from the seed at planting time.

During the summer Mr. W. A. Moss, Superintendent of the Tetonia Branch Station, noticed the greater prevalence of black leg developing in these lots over similar plantings in which black rot was present in less severe amounts. It is not to be inferred that the two diseases are the same but rather that black-rot injury offers an entry for the black leg organism.

Examination of Certified Seed Lots

It is required of all seed lots in Idaho entered for certification that in the fall previous to the growing season a representative lot of about 600 tubers of small size (2 oz.) shall be sent to the Aberdeen Branch Station. Half of the sample is planted in early December in the California plots for disease readings and half of each sample is stored in the cellar at Aberdeen and then planted at the Station for performance records.

Mr. John Toevs suggested to the writer that an examination of all these lots from throughout the State would be a desirable way to check on black rot. This was especially true since many of the cellars had been visited personally and notes on disease and storage conditions taken. It is assumed that no rotted tubers were present in the original sample since they were all hand picked. Subsequent treatment was identical.

The examinations, on May 7-8, 1945, of all the certified lots were made by Dr. Lowell Neilsen, in charge of Potato Research, John L. Toevs, Superintendent of the Aberdeen Branch Station, and the writer, with the assistance of the Station crew. Each lot was run over the sorter and rotted tubers were removed and placed in paper bags. Although the total number of tubers was not determined there were approximately 300 in each lot. The predominant rot was diagnosed as black rot although isolations were not made. Through unavoidable circumstances the counts in a few lots were lost and do not appear in the summary in Table 1.

Table 1. Showing among 227 individual lots of Russet Burbank potatoes the number of potato growers whose 300-tuber certified seed sample contained a certain class number of tubers affected with black rot (*Fusarium* spp.). Aberdeen, Idaho, May 1945[a]

	Classes -- number of rotted tubers							
	0	1-5	6-10	11-20	21-30	31-50	51-70	112
Number of lots	4	103	45	48	9	13	4	1

[a]The lots were all kept under identical storage conditions in a cellar at Aberdeen from November 1, 1944 to May 7, 1945

Considering that in each sample there were approximately 300 tubers, the percentage of black rot is not particularly high for most of the lots. The most interesting point is the extreme variation in the amount of rot -- from 0 in 4 lots to over 30 percent in one case. In Bliss Triumph one lot contained nearly one-third of affected tubers while other lots were almost free. It would appear that certain lots of cer-

tified seed potatoes of the Russet Burbank variety are more liable to be affected with black rot than others when stored under the same conditions. It seems logical to conclude that the inoculum or incipient infection varies quite widely among the different lots.

General Conclusions

The results of the survey on both commercial and certified seed lots show quite clearly that black rot as a storage disease is an important item. Although details of the data are not shown, there is very good evidence that black rot develops most rapidly and may become disastrous under storage conditions of comparatively high humidity and high temperature with poor ventilation, especially when tubers are very immature or are handled roughly at harvest. It is believed that certain lots carry more inoculum than others into storage.

As a general rule the straw, willow, soil structure of potato storage covering makes for easier control of proper conditions than do the airtight coverings. Storages in which free moisture readily collects on the ceilings usually show much more black rot than the "dry" cellars. It is believed that loss from shrivel in dry cellars is far less than that from rot in the wet, drippy cellars. Crops that are harvested carefully, cooled down promptly and then kept in a dry, well-ventilated and cool cellar (40 ° F) usually keep well. Of course, action of other factors produces apparent exceptions.

Literature Cited

1. Blodgett, Earle C. Potato diseases in Idaho in 1943. Plant Dis. Rptr. 29: 51-57. 1945
2. Cassell, Robert C. Fusarium rots and other storage diseases of potatoes in New York. Plant Dis. Rptr. 29: 337-342. 1945
3. Cunningham, H. S., and O. A. Reinking. Fusarium seed-piece decay of potatoes on Long Island. Farm Research, New York State Agr. Exp. Sta., Geneva, and Cornell University, Ithaca, New York, 11: 8-9. 1945
4. Dykstra, T. P. Potato diseases and their control. U. S. Dept. Agr. Farmers' Bull. 1881. 1941
5. Link, G. K. K., and Glen B. Ramsey. Market diseases of fruit and vegetables. Potatoes. U. S. Dept. Agr. Misc. Publ. 98. 1932.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

BROWN STEM ROT OF SOYBEAN IN MISSOURI

J. M. Crall

Soybean plants forwarded to this station from Taylor, Missouri (across the Mississippi River from Quincy, Illinois) showed symptoms of the brown stem rot disease[1]. Isolations from these plants yielded the as yet unclassified causal fungus. Verification of the identity of the fungus was made by Dr. W. B. Allington of the U. S. Regional Soybean Laboratory, Urbana, Illinois.

From a talk with the farmer in whose fields the disease was occurring it was learned that the first affected plants were noted during the first week in September. At the time the field was seen by the writer on September 24, the plants were maturing and accurate estimates of the severity of the infection were difficult to make. However, at least 40 acres of a 145-acre field of Illini were showing general infection, with scattered infection throughout the rest of this field and an adjacent large field planted to Illini. Both of these fields had been in soybeans for the past several seasons. A nearby 10-acre field of Lincoln planted on "new" ground showed no brown stem rot.

Although a complete survey of the district was not made, brown stem rot was found in several other fields in the vicinity. In addition, unverified reports have been received of the occurrence of this disease in the river bottom lands east of Palmyra, Missouri (10 miles south of Taylor). No other occurrences of the disease in Missouri are known.

The most striking symptom of the disease was a marked interveinal chlorosis, followed by necrosis, of the leaflets. Such plants always showed the characteristic brown rot when the stems were split.

An unusually cool late summer is believed to have been a factor contributing to the outbreak of the disease this season.

Brown stem rot has been reported as appearing in a few fields in Illinois in the fall of 1944 and occurring in severe epidemic form in Central Indiana, Illinois, and Iowa in 1945[1]. This is the first reported occurrence of the disease in Missouri.

DIVISION OF FORAGE CROPS AND DISEASES, U. S. BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, and AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF MISSOURI

---

[1]Allington, W. B. Brown stem rot of soybean caused by an unidentified fungus. Phytopath. 36: 394. (Abstract). 1946

ANOTHER EPIPHYTOTIC OF FALL WHEAT LEAF RUST IN THE SOUTHWEST

K. Starr Chester and D. A. Preston

Wheat leaf rust [Puccinia rubigo-vera var. tritici] is epiphytotic in Oklahoma and Kansas this fall, with early-planted fields noticeably yellowed over a great part of the Oklahoma wheat area.

Following observations of severe leaf rust in and about Stillwater, Oklahoma, two survey trips were made, one on November 23 from Stillwater 135 miles westward to Woodward, through the heart of the wheat-producing area, following a direct route through Enid, and another 240 miles westward through Blackwell, Woodward, and Boise City at the western end of the Oklahoma Panhandle on December 6-8. On both traverses it was found that the rusty yellowing of early-planted wheat extended throughout the area surveyed. It was much more pronounced in the Panhandle Counties than elsewhere. Leaf rust on the older leaves averaged 50 percent intensity on the Cobb scale, reducing the grazing value and predisposing the crop to winter injury.

That the epiphytotic extends far to the north and south of the area surveyed is indicated by additional reports. Dr. A. M. Schlehuber observed a similar intensity of the rust for 150 miles north of Stillwater into Kansas. Mr. W. M. Osborne, Superintendent of the Dry Land Experiment Station at Lawton, 130 miles southwest of Stillwater, wrote on November 28: "I don't believe that I have ever seen fall wheat carry a heavier infection of leaf rust than at present."

Average percentage infection of young and old leaves in the fields surveyed was as follows in the various Oklahoma counties: Cimarron, 20-30; Texas, 5-25; Beaver, 20-70; Harper, 10-60; Woods, 5-20; Woodward, 10-20; Alfalfa, 15-20; Major, 20; Grant, 20; Garfield, 20; and Noble, 20. On many plants throughout the survey area the lower leaves were rated 100 percent on the Cobb scale. The highest concentration of rust observed anywhere was in Beaver County and adjacent parts of Harper County, at the entrance to the Panhandle. Heavy rust in this normally arid region is most unusual.

Rust readings were taken on early-planted fields with wheat of approximately the same age. Because early fall rains were followed by a prolonged dry period, about half the wheat was early-planted and the remainder was planted much later, and the late-planted wheat had not reached sufficient age to have had time for heavy rust development. Volunteer wheat, wherever it occurred, was heavily rusted.

A noteworthy feature of the epiphytotic has been the high susceptibility of Pawnee wheat. This variety, formerly recommended for leaf rust resistance, is being grown on a rapidly-increasing acreage in

Oklahoma. Its past resistance has been chiefly due to its type 0 reaction to leaf rust race group 9[1], which in the past has constituted the bulk of the rust population in the Southwest. With the expanding acreage of Pawnee wheat there has been a marked reduction of race group 9 in the rust population and an increase in race groups to which Pawnee is susceptible, notably groups 2, 6, and 12[2]. Race identification of 20 single-pustule cultures of fall rust on Pawnee wheat at Stillwater yielded 7 determinations of race 6, 6 of race 2, 3 of race 12, and 2 of race 5, to all of which Pawnee is highly susceptible. One culture proved to be of race group 45, which had not previously been found in Oklahoma. The one remaining culture was of race group 9 and is probably explainable by a slight mixture of some other wheat variety in the Pawnee seed.

At Stillwater, readings made on November 24, December 1, and December 8 showed a concentration of rust on Pawnee fully equal to that on comparable plots of highly-susceptible varieties such as Fulcaster. The rust pustules on Pawnee were mainly of the fully-susceptible type 4. This was on early-planted (September 6) wheat. On later-planted (October 15) Pawnee, scattered type 4 pustules were readily found. Their number increased from 60 per 100 leaves on older leaves to 106 per 100 leaves during the week of November 24 to December 1, indicative of the rapid tempo of rust increase at this late date. The following week there was only slight further increase to 116 pustules per 100 leaves.

There are two practical conclusions to be drawn from this heavy epiphytotic of fall rust. In the first place, farmers have been advised to reduce grazing on affected tracts lest the combined loss of foliage from grazing and rust result in loss from winter injury. In the second place, growers have been reassured that this unusual outbreak does not necessarily imply severe rust damage next spring. Notes in the "Plant Disease Reporter" indicate that epiphytotic wheat leaf rust in the Southwest in 1927, 1930, 1931, 1938, 1940, and 1941 was followed in each case by lighter than average rust in the following spring, and in 8 years of heavy fall rust this was followed by heavy spring rust in only 2 years (1925/26, 1926/27).

No other cereal disease has been found in destructive proportions in the Southwest at this time. There is a moderate development of crown rust [Puccinia coronata] of oats at Stillwater and Lawton, a field of

---

[1]For the concept of race groups as used here, see Chester, K. Starr, "The Cereal Rusts as Exemplified in the Leaf Rust of Wheat", Chronica Botanica Co., Waltham, Mass., 1946

[2]Chester, K. Starr, "The significance and usefulness of the leaf rust reactions of Pawnee wheat." Proc. Oklahoma Acad. Sci., 26, 1946. (In press.)

barley was found with 5 percent leaf rust [P. anomala] in Texas County, and a trace of barley leaf rust was reported from Lawton. Specimens of barley with abundant infection of Septoria passerini have been received from a location south of Wellington, Kansas, about 12 miles north of the Oklahoma line. The field was reported to be noticeably yellowed, and Septoria was evidently the cause. As usual, no stem rust has been found on any of the cereals.

OKLAHOMA AGRICULTURAL EXPERIMENT STATION
STILLWATER, OKLAHOMA
December 12, 1946

BUNT OF WHEAT IN WESTERN NEBRASKA IN 1946

J. E. Livingston

Stinking smut or bunt (Tilletia foetida) has become a serious disease in wheat in Western Nebraska, particularly in the northwestern counties. Not only was the percentage of fields infected alarmingly high in 1946, but also the amount of infection found in some fields was very high. Of a total of 151 fields observed 67, or 44 percent, were bunted. The amount of infection per smutted field was as follows:

47.8%	of	the	smutted	fields	had	a	trace	of	bunt	
20.9%	"	"	"	"	"	from	0.5-	5%	of	smutted heads
9.0%	"	"	"	"	"	"	5	-10%	"	" "
12.0%	"	"	"	"	"	"	10	-20%	"	" "
1.5%	"	"	"	"	"	"	20	-30%	"	" "
6.0%	"	"	"	"	"	"	30	-50%	"	" "
3.0%	"	"	"	"	"	over		50%	"	" "

The bunt problem is confined to the Western Nebraska counties listed in Table 1.

Approximately 1,127,160 acres of wheat were grown in this area in 1946. This was about 28 percent of the total acreage of the State. The area with the heaviest infection comprises the four northwestern counties, Sheridan, Dawes, Sioux, and Box Butte, totaling 201,400 wheat acres. Several fields in these counties had 30 percent of the heads smutted and in one field 94 percent of the heads were destroyed.

In general, the counties in the south half of the Panhandle had a high percentage of fields with bunt but the amount of infection per field was very low. In Banner County, for instance, 80 percent of the fields were bunted but no field showed more than a trace of infection.

The reason for the presence of so many fields with less than 0.5 percent infection is open to speculation. Many growers feel that the

Table 1. Incidence of stinking smut or bunt on wheat in Western Nebraska.

County	Field survey					
	Percent fields bunted		Average percent infection per bunted field		Range of infection	
	1944	1946	1944	1946	1944	1946
Northern Panhandle						
Sheridan	81	62	5.7	6.3	T-35	T-31
Dawes	52	31	11.2	8.0	1-35	6-30
Sioux	67	62	10.5	14.0	1-33	6-40
Box Butte	84	47	6.7	22.2	T-60	T-94
Southern Panhandle						
Morrill	33	50	9.0	6.1	1-17	T-27
Scotts Bluff	100	25	8.6	1.0	1-20	T-2
Banner	25	80	1.0	T	1-8	T
Kimball	30	27	1.0	5.3	1-3	T-15
Cheyenne	--	44	--	1.0	--	T-3
Deuel	--	25	--	4.5	--	T-9
Keith	--	29	--	8.0	--	5-11
Perkins	--	12.5	--	0.5	--	0.5

large number of transient combines are responsible for the widespread distribution of inoculum. Weather conditions have been very favorable, judging by the high percentage of infection in some fields. It is possible that some infection came from the soil since not more than two weeks elapsed between harvesting and replanting in a few instances. This probably would be true of only a few fields, however, as approximately 80 percent of the acreage is planted on summer-fallowed land.

There was a slightly higher percentage of winter wheat than spring wheat fields infected. The winter wheat acreage is planted principally to the susceptible Cheyenne and Turkey wheats with a limited acreage planted to Nebred which is resistant to the forms of T. foetida found in Nebraska. Of the spring wheats, there is a fair acreage of Thatcher, Ceres, Pilot, and Rival. The spring wheat acreage is largely confined to the northwestern counties bordering on South Dakota.

It is evident that abundant inoculum is present for the development of a bunt epidemic unless control measures are used on a wide scale. An intensive bunt control campaign was conducted in 1945 and again in 1946. The difficulty of obtaining commercial treating equipment, which is desirable for the large acreages planted, has interfered considerably. However, growers, elevator men, and the business men in the area recognize the problem and a high percentage of the wheat planted in the fall of 1946 was treated.

NEBRASKA AGRICULTURAL EXPERIMENT STATION, LINCOLN, NEBRASKA

VERTICILLIUM WILT OF COTTON

VERTICILLIUM WILT OF COTTON IN ARKANSAS

By V. H. Young

The outstanding recent development is the widespread serious nature of Verticillium wilt of cotton this year. It appears to be present in most of the Mississippi Delta region and is causing serious losses in some of the most productive cotton land of Mississippi and adjoining Counties. Many fields have a scattering of the disease all over the field and spots in which half the crop is gone. I am tentatively placing the loss at 5 percent in some of our best cotton land where Fusarium wilt is unknown.

The first reports came in late July but little notice was taken of the disease until late August. There is great concern over the disease at the present time. Top bolls are shed and in severely attacked plants lower bolls fail to open properly and have weak lint.

A recent report of what appears to be the same trouble comes from Arkadelphia southwest of Little Rock but no isolations have been made as is the case with the cotton from the Delta. Weather has been exceptionally cool, especially at night since midsummer. -- UNIVERSITY OF ARKANSAS, FAYETTEVILLE, ARKANSAS. October 11

VERTICILLIUM WILT IN THE EL PASO VALLEY OF TEXAS

By P. J. Lyerly

As usual, Verticillium wilt was the principal disease of cotton in the El Paso Valley of Texas District 6. The disease appeared somewhat later than usual and fair yields of lint were obtained from many fields with a high incidence of infection. While damage on some fields was unusually severe, loss (reduction in yield and quality) throughout the region appeared to be about normal. Damage was most severe in the vicinity of Clint and Fabens. The disease now occurs on many more fields than in previous years.

This report pertains only to Texas District 6, as Verticillium wilt is not an important disease of cotton in other regions of Texas. -- TEXAS AGRICULTURAL EXPERIMENT STATION, EL PASO VALLEY SUBSTATION NO. 17, YSLETA, TEXAS. November 1

VERTICILLIUM WILT IN NEW MEXICO

By A. R. Leding

The general opinion of those who have had opportunities for making observations seems to be that the damage to cotton by Verticillium wilt this year in New Mexico is not greatly different from last season. Without some sort of a systematic survey it is difficult to say just how much damage occurred. The distribution of the disease is decidedly "spotty". Some fields where the disease seriously damaged the crop in 1945 were not much hurt this year, while in other cases the reverse was true, and the disease was worse this year.

Its behavior this year was different from last year. In 1945 the disease did not make its appearance until late August or early September; at least the normal symptoms were not generally apparent, but it then did considerable damage on some farms. This year the disease began to appear earlier in the season, as is usually the case, and in some places serious damage resulted, in others comparatively little. In our breeding plots at this station, all sorts of effects were noted, from complete killing of the plants to recovery and setting of fairly good crops. This has been characteristic of the behavior of the disease here in most seasons.

In this area the disease is scattered throughout the Mesilla Valley and the El Paso Valley, with probably somewhat more of it in the latter. Dr. Lyerly of the Texas Branch Station at Ysleta has written you in this connection. The disease is also present in the Deming and Virden districts, which lie west of here in Luna and Hidalgo Counties, respectively. In the Pecos Valley in Eastern New Mexico, in Chaves and Eddy Counties, the disease is also pretty well scattered, but not to the extent it is here in the Rio Grande Valley. We have not yet seen the disease in the vicinity of Fort Stockton or Pecos, Texas. -- DIVISION OF COTTON AND OTHER FIBER CROPS AND DISEASES, U. S. COTTON FIELD STATION, STATE COLLEGE, NEW MEXICO. November 20

VERTICILLIUM WILT OF COTTON IN CALIFORNIA IN 1946

By G. J. Harrison and L. A. Brinkerhoff

Verticillium wilt was widely distributed in cotton plantings in the San Joaquin Valley of California in 1946. The early part of the growing season, which was somewhat cooler than normal, was especially favorable to the development of the disease. Twenty percent of the total cotton acreage is estimated to have been affected. The most severe injury was observed in Fresno and Tulare Counties. The disease was

most prevalent along the west side of the San Joaquin River in the former County, while in the latter it was widely distributed. In plantings in which Verticillium wilt became epiphytotic yields are believed to have been reduced by as much as 5 to 20 percent.

The entire 1946 cotton acreage was planted to Acala P18-C, a variety which shows considerable tolerance to the Verticillium wilt fungus. -- DIVISION OF COTTON AND OTHER FIBER CROPS AND DISEASES, U. S. COTTON FIELD STATION, SHAFTER, CALIFORNIA

TOBACCO DISEASES IN CONNECTICUT IN 1946

P. J. Anderson

Most of the common diseases of tobacco caused less than average damage in 1946. Two notable exceptions were wildfire and nematode diseases. Diseases not observed at all during the season are blackfire, Fusarium wilt, Alternaria spot, and hollow-stalk.

Wildfire [Pseudomonas tabaci]. In our report on this disease for 1945 it was suggested that since, after many years of retirement, wildfire had appeared in scattered fields that year, this might signal the start of a series of epidemic years such as we experienced in the early Twenties. Its behavior in 1946 furnishes further evidence of a build-up. It was observed in a number of seed beds in different parts of the State and in Massachusetts during the first week in June. From the beds it was carried into the fields and by the first week in July some fields, especially in the northern part of the tobacco-growing section, were thoroughly infected. Its further spread was checked by the drought, which lasted in most of the tobacco area from the middle of June to the 20th of July. With the return of rainy weather after that wildfire started to work up toward the top leaves and caused severe damage in many fields before they were harvested. Most of the farms in the central part of the tobacco section, however, suffered little damage or were entirely free from wildfire. The relatively few centers of infection coupled with the checking effect of the long drought saved the tobacco of this section from severe losses.

Treating the seed bed with Bordeaux mixture is still considered the best preventive measure against wildfire.

Nematodes. No nematode damage to tobacco has previously been found in Connecticut. This year one field of Shade that showed such stunted growth that the crop was practically worthless was found to have numerous small galls on the roots in which females of the root-knot nematode [Heterodera marioni] were imbedded. Meadow nematodes (Pratylenchus pratensis) were also found in this same field and in several

other fields showing retarded growth. In previous years this same condition has been called brown root rot.

Ammonia injury. This seed bed trouble was seen in a number of beds this year. Usually it came as a result of seeding the beds too soon after steaming.

Pythium damping-off in seed beds at the two or four-leaf stage was noted early in several beds. Typically, all the little seedlings, in areas five to twelve inches across, toppled over and lay prostrate, with shrivelled stalks. Insufficient aeration was the principal contributing factor.

Bed rot (Pythium aphanidermatum) was observed in many beds this year and was often mistaken for [downy] mildew by the growers. It occurred from the time the plants were an inch high up to setting time. Affected areas were usually only a few inches across but there was a complete kill of all plants in the area. Rotted plants formed a crust over the soil surface.

[Downy] mildew (blue mold) [Peronospora tabacina]. The most surprising feature about mildew this year was its early appearance. The first case was seen on May 1, ten days earlier than has ever been recorded here. Since the coming of spring was much earlier than usual this year, possibly the earlier appearance of mildew could have been anticipated. By the middle of May the disease was found in beds in widely separated sections. It is worthy of note that no case of mildew was seen in 1946 in any bed where the owner had sprayed properly with Fermate. Fermate is now used by all the large growers and by the majority of the smaller growers. None of the growers of large acreages was seriously troubled with mildew this year. Those who lost their plants were growers of small acreages, who did not think it worth while to spray, or beginners who had had no experience with the disease. Mildew caused no trouble in the fields. In experiments at the Station, Fermate dust gave as perfect control as Fermate spray.

Mosaic (calico) [virus] appeared to be a little more prevalent than usual, especially in the Broadleaf variety. In the breeding work through which we are attempting to obtain Broadleaf with a high resistance, a strain was isolated this year that proved to be completely immune from mosaic. Whether this strain is commercially acceptable has not yet been determined.

Sore shin was found in Havana Seed in considerable abundance in the northern part of the Valley late in the season. It has never been found in abundance on Broadleaf or Shade.

Dead blossom leaf spot did not cause much trouble this year but became prevalent in Shade tobacco late in the season when only the least

valuable top leaves were still on the plants.

Pole rot did not cause a great deal of damage this year, probably because the curing season for the most part was quite dry. The form known as "slimy-stalk" was brought to our attention by many growers. In every case the associated fungus was found to be Botrytis. In no case was Sclerotinia found. The relative prevalence of these two fungi is just the reverse of 1945.

Black root rot [Thielaviopsis basicola] was not found to a serious extent anywhere this year. The relative freedom of the Havana Seed crop is probably due to the high proportion of root rot-resistant strains that are now grown in the Valley. Root rot-resistant strains of Shade are also being grown in larger amounts. The Broadleaf type is not so subject to black root rot as the other two. The value of chloropicrin (Larvacide) as a fungicide against the black root rot was determined in one Shade field in Windsor that is always seriously affected with root rot. Larvacide is used extensively in the seed beds here for killing weeds but we have never had occasion to find out how effective it is against fungi. In the worst part of this field the Larvacide was drilled into the soil three weeks before the plants were set and at the usual rate for treating seed beds. On five bents it was applied equally over all the soil. On five other bents it was concentrated in strips where the rows were to be set later. The rest of the field was untreated. The difference in growth between the treated and untreated parts was remarkable, even at a distance. The treated plants were four feet tall when the untreated were only half as tall. On hot days when the untreated plants wilted badly no wilting occurred on the larger treated plants. The treated bents produced a better than normal yield; the untreated, a crop that it did not pay to harvest. When the roots were dug, very few lesions were seen on the treated plants while they were so numerous on untreated plants that a large part of the root system was destroyed. There could hardly be any doubt about the value of Larvacide against the black root rot fungus. Larvacide is, however, not recommended for field application -- at least not at the rate and time of application used in this test -- because the chlorine in it has an adverse effect on the combustibility of the cured tobacco.

Brown root rot. Several cases of brown root rot were observed where tobacco followed hay or cereal crops. Possible relation of some of this brown root rot to meadow nematode is mentioned above.

CONNECTICUT AGRICULTURAL EXPERIMENT STATION
TOBACCO AND VEGETABLE SUB-STATION
WINDSOR, CONNECTICUT

NUT DISEASES AND DISORDERS IN OREGON IN 1946

P. W. Miller

Walnut Diseases

Walnut blight (Xanthomonas juglandis (Pierce) Dowson) was widely distributed in Western Oregon in 1946, causing greater loss than normal. It was very prevalent and destructive in the northern part of the Willamette Valley. For the State as a whole it is estimated that approximately 25 percent of the potential walnut crop in non-sprayed orchards was either completely destroyed or adversely affected in quality. In certain non-sprayed orchards in the northern part of the Willamette Valley, losses from this disease were much greater, ranging from 45 to 60 percent of the potential crop.

Mushroom root rot (Armillaria mellea Fr.) was the cause of the death of a limited number of Persian (English) walnut trees in Oregon in 1946.

Ring spot (Ascochyta juglandis Boltsh.) was found on the foliage in several Persian walnut orchards in Western Oregon in 1946. However, it was not of any economic importance as only an occasional leaf on a tree was diseased and on those that were infected the lesions were not sufficiently abundant to cause any significant decrease in the functional leaf area.

Downy spot (Microstroma juglandis (Bereng.) Sacc.). This leaf spot disease occurred in sparse amounts in a few orchards in the Willamette Valley in 1946. It was of no economic importance, however, since it did not cause any defoliation or decrease the functional leaf area to any significant extent.

Leaf scorch (non-parasitic). This disorder was widely distributed in Oregon in 1946, occurring to a greater or less extent in most Persian walnut orchards in the western part of the State. In orchards on certain soil types deficient in boron it was very prevalent, causing a significant decrease in the functional leaf area from death of the tissues and from premature defoliation. Applications of borax in sufficient quantities to the soil appreciably decreased the amount and severity of this disorder.

"Black-line" (girdle) of grafted walnuts (non-parasitic). This disorder caused the death of more grafted Franquette walnut trees in 1946 than any other agency. It was widely distributed, occurring to a greater or less extent in practically all walnut-growing districts in the State. All of the trees found affected belonged to the Franquette variety grafted either on California black walnut rootstock (Juglans hindsii Sarg.) or on hybrids of other species with this one.

Root-rot (cause undetermined). A root-rot of undetermined origin was found affecting a number of Persian walnut trees grafted on Califor-

nia black or on hybrid black walnut rootstock. Most of the affected trees are located in hill orchards on shallow or marginal soils.

Attempts to isolate a parasitic microorganism from affected tissues have so far been unsuccessful.

Filbert Diseases

Bacterial blight (Xanthomonas corylina (Miller et al.) Dowson) was widely distributed in 1946, occurring to a greater or less extent in practically all filbert orchards in the State. It was more abundant in young orchards, from one to three years of age, than it has been for several years past, causing the death of many young trees. However, it was not so prevalent in older orchards as in the two preceding years.

Mushroom root-rot (Armillaria mellea Fr.) caused the death of a limited number of trees in a few orchards in the Willamette Valley in 1946.

Crown gall (Agrobacterium tumefaciens (E. F. Sm. and Town.) Conn.) was found on a number of young trees in a nursery in the northern part of the Willamette Valley.

Mildew (Phyllactinia corylea (Pers.) Karst.) occurred in varying amounts in almost all orchards in the Willamette Valley in 1946. However, it was apparently of no economic importance as it did not appear until very late in the season. The infected leaves retained their normal green color until the end of the season and persisted on the trees until the time of normal leaf fall.

Leaf scald (non-parasitic). This disorder was widely distributed and unusually severe in Oregon in 1946. The abundance of scald was associated with the occurrence of abnormally high temperatures during the middle part of July. The trouble was much worse in orchards located on relatively shallow soils with low reserves of soil moisture. Under such conditions, it caused a significant reduction in the functional leaf area from death of the tissues and from premature defoliation.

Brown-stain (non-parasitic). This disorder of the nuts occurred in limited amounts in a number of orchards in the Willamette Valley in 1946.

Filbert shrivel (non-parasitic). This disorder of the nuts was widely distributed in Oregon in 1946, occurring in greater or less amounts in practically every orchard in the State. It is estimated that the loss from this disorder will approximate 5 percent of the potential filbert crop, which is about twice as much as occurred in 1945.

DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
U. S. DEPARTMENT OF AGRICULTURE

THE DEVELOPMENT OF WHITE PINE BLISTER RUST IN AN UNPROTECTED AREA IN NORTH CAROLINA

Henry E. Yost and George H. Hepting[1]

In the fall of 1945, blister rust [Cronartium ribicola] was reported for the first time on white pines in Southwestern Ashe County in North Carolina. Judging from the age of cankers, the rust apparently invaded this section in 1936 and is now generally distributed over about three acres of pine. Both Ribes rotundifolium and Ribes cynosbati are present on the infected area. At the time of this discovery the nearest known infections on white pine were in West-central Virginia in the vicinity of Hot Springs, in the Alleghany Mountain Range, and Tye River Gap, in the Blue Ridge Range. The North Carolina infection is particularly significant, because it represents an isolated location about 100 miles south of the nearest previously known pine infection. The Ashe County infection undoubtedly resulted from the natural spread of aeciospores and has developed under natural conditions for several years.

A study is under way on this area to observe the development of blister rust on pine and Ribes from its origin to date, and to continue observations for an indefinite period, to obtain information on damage to be expected from blister rust in a mixed age stand in the southern part of the Appalachian Region.

A 1-acre plot has been established on which data have been taken on the extent of infection of all white pines on the plot. Infection data were also taken on the Ribes bushes on the same acre and also in a surrounding zone about one chain (66 feet) wide or on a total area of about 2 1/2 acres. On the 1-acre plot 151 white pine trees were found of which 93 trees or 62 percent were infected. Of the 93 trees, 1 was killed by the rust, 46 were regarded as lethally infected, and the remaining 46, while infected at one time or another, have a good chance of not being killed. A total of 414 cankers were found on the plot. Ribes bushes were found on the 2 1/2 acres at the rate of 12 bushes with 98 feet of live stem per acre. The plot has been left in its natural state and was fenced to prevent damage from grazing animals.

DIVISION OF PLANT DISEASE CONTROL, BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, AND DIVISION OF FOREST PATHOLOGY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AGRICULTURAL RESEARCH ADMINISTRATION, U. S. DEPARTMENT OF AGRICULTURE

---

[1]Pathologists, respectively, with the Division of Plant Disease Control, Bureau of Entomology and Plant Quarantine, and Division of Forest Pathology, Bureau of Plant Industry, Soils, and Agricultural Engineering

NOTES ON SOME WESTERN WOOD-DECAY FUNGI

James L. Mielke and Ross W. Davidson[1]

Observations and preliminary decay studies on certain conifers in Colorado, Utah, Arizona, and New Mexico have led to discoveries of fungi not previously reported from these States and have also revealed new hosts for some wood-rotting fungi already known to be present. It was necessary in some cases to make the identifications from cultures, because sporophores were not associated with the decay. All of the fungi here reported were causing decay in living trees. Some of them have been previously reported as attacking only dead timber. The preliminary studies indicate that a considerable number of wood-destroying fungi attack certain of the conifers in the States mentioned above but little is yet known regarding their relative importance in the pathology of these stands.

Armillaria mellea is the common cause of a root and butt rot of conifers in Colorado, Arizona, New Mexico, and Southern Utah. It attacks trees of all ages. The fungus has not yet been found in this region on oaks, which are the common hosts in the Pacific Coast States. Sporophores are rare and have been found only in the fall following abundant summer rains.

Coniophora cerebella was isolated from brown butt rot in living Picea engelmanni from Grand Mesa and Arapaho National Forests in Colorado. Sporophores were common on down dead trees in these areas.

Fomes annosus is widely distributed but not common in the Southwest where it has been found killing certain conifers as follows: Abies concolor on the Cibola and Carson National Forests in New Mexico, Picea engelmanni on the Cibola National Forest, and Pinus ponderosa var. scopulorum on the Coconino National Forest in Arizona and the Powell National Forest in Utah. The fungus does not appear to have been previously reported from Utah. Baxter (Papers Mich. Acad. Sci., Arts and Letters 26: 113-118. 1940) reported it from Arizona and New Mexico but did not mention the hosts. Sporophores, when present, are produced mainly on the younger trees and usually develop on dying trees shortly before the foliage begins to fade. In the Southwest the fungus has been found only on areas with sandy or light soils.

---

[1]Grateful acknowledgment is made to E. M. Hornibrook, Rocky Mountain Forest and Range Experiment Station, who assisted the authors with collections and also independently collected for their use many wood-decay specimens and sporophores, particularly on the Fraser Experimental Forest in Colorado

Fomes officinalis was isolated from typical decay in Pinus contorta var. latifolia from the Arapaho National Forest. A sporophore of the fungus was found in 1934 on P. ponderosa var. scopulorum on the San Juan National Forest by T. M. Wilmore and Don E. Ellis, formerly of the Division of Forest Pathology. Both of these collections are from Colorado and appear to be the first report of the fungus from that State.

Fomes nigrolimitatus was isolated from typical large-pocket rot in the heartwood of the basal portion of a living Picea engelmanni on the Grand Mesa Forest. Cultures from decayed wood were similar to cultures from sporophores from down dead trees. On the Fraser Experimental Forest, E. M. Hornibrook found sporophores of the fungus on a living P. engelmanni with an old basal injury. Typical decay was present in the lower portion of the bole. Sporophores of this fungus are very common on old spruce logs in Colorado but it has not previously been reported from living trees. On the Fraser Experimental Forest it was especially common on an area where there were many large overmature spruce trees. The decay in the down dead trees seemed to have started at the base, probably while they were still alive, and advanced upwards in the trunks. Sporophores were also collected at the base of standing dead trees in the same area.

Fomes pini is common in lodgepole pine, Engelmann spruce, and alpine fir in Colorado where it produces sporophores in abundance on down dead trees but rarely on living trees, just the reverse of its behavior elsewhere in the West. When sporophores occur on living trees they appear usually within a few feet of the ground. Decay caused by the fungus has been found in the roots.

Lentinus lepideus was isolated from decayed wood of Picea engelmanni growing on the north rim of Grand Canyon National Park in Arizona. Decay extended throughout most of the heartwood of this large tree, which was recently broken off by the wind. The fungus evidently gained entrance through dead witches' brooms caused by the rust Peridermium coloradense. Engelmann spruce is a new host.

Polyporus balsameus was found to cause a root rot and butt rot in Abies lasiocarpa on the Cedar Breaks National Monument in Utah. It was also isolated from Picea engelmanni on the Roosevelt National Forest in Colorado. The fungus has not been previously reported on either of these hosts or west of Minnesota. No sporophores were found but it was readily isolated in culture from decayed wood. In alpine fir it appeared to be spreading from tree to tree through grafted roots.

Polyporus circinatus has been observed to cause a common root and butt rot in Picea engelmanni on the Carson and Cibola National Forests in New Mexico, the Kaibab Plateau in Arizona, and on Cedar Breaks National Monument in Utah, hitherto unreported localities for the fungus. Observations on the Fraser Experimental Forest indicates that it is

probably one of the most common causes of root and butt rots of Engelmann spruce in Colorado. Abies lasiocarpa and Pinus contorta var. latifolia, both of which are new hosts, were affected by it. Entrance to the host is mainly through roots. Sporophores of the fungus were very common in the fall of 1945 following abundant summer rains. In 1940 P. circinatus was isolated from rot in Pinus ponderosa var. scopulorum on the Apache National Forest, Arizona, collected by Don L. Cerred, Sr. of the United States Forest Service. The first collection of sporophores of the fungus on P. ponderosa var. scopulorum in the region was made in September 1946 on the Santa Fe National Forest in New Mexico. They were attached to roots of a large wind-thrown tree containing much root rot. Curved setae were found in these sporophores from ponderosa pine and because of this character some authorities regard the fungus as P. circinatus var. dualis. Sporophores from the other hosts mentioned above have straight setae. There does not appear to be a previous report of P. circinatus on P. ponderosa var. scopulorum. Wood of this pine in the incipient stage of decay is pinkish, whereas in Engelmann spruce and lodgepole pine it ranges from pinkish to a dark purplish shade, with the latter predominating. Also, in the advanced stage of decay in the latter two species the white rot pockets contain black flecks similar to those that occur in wood decayed by Fomes annosus. This characteristic, which has been used to distinguish between the decay caused by the two fungi, therefore cannot always be relied upon.

Polyporus osseus sporophores were found attached to the base of two trees of Pinus contorta var. latifolia in late September 1945 by E. M. Hornibrook on the Fraser Experimental Forest, Arapaho National Forest, Colorado. The fungus, which causes a brown butt rot, has not been reported previously on this host.

Poria microspora was found causing heartrot in Pinus contorta var. latifolia on the Fraser Experimental Forest, Colorado. This is a new host for the fungus and the first report of its occurrence in Colorado. No sporophores were present. Cultures were sent to Dr. Mildred K. Nobles of Canada, who confirmed the determination.

Stereum sanguinolentum sporophores were common in 1945 on the Fraser Experimental Forest, Colorado. It was found causing decay in living Picea engelmanni and Abies lasiocarpa, both of which are believed to be new hosts.

Stereum sulcatum was isolated from yellow stringy rot in the base of a large living Picea engelmanni in a logging area on the Fraser Experimental Forest. The decay was not quite typical, for in logs and bases of dead trees, where it is commonly found fruiting, decay ranges from a white pocket to white stringy rot. The habit of this fungus, based on sporophore development, is quite similar to that of Fomes nigrolimitatus and in older stands both would be expected to cause some butt rot

of living trees.

Fametes serialis was isolated from brown butt rot in living Pinus contorta var. latifolia and Picea engelmanni on the Fraser Experimental Forest.

DIVISION OF FOREST PATHOLOGY
BUREAU OF PLANT INDUSTRY, SOILS AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
U. S. DEPARTMENT OF AGRICULTURE

BRIEF NOTES ON PLANT DISEASES AND A CORRECTION

THE NEW HELMINTHOSPORIUM DISEASE OF OATS IN LOUISIANA

By I. L. Forbes

The new blight and root rot disease, caused by a species of Helminthosporium, was first found in Louisiana on December 2, 1946, at Cheneyville. We were called to the farm of Mr. H. P. Wemple who was growing oats for dehydration. He had become alarmed over the dying of the Stanton variety. The oats had been planted about September 5, with seed brought in from Arkansas. In oats that had not been cut we found a great deal of dead foliage, particularly on the lower portions of the plants. On December 2, the oats had one to three joints. On oats that had been cut about November 10 for dehydrating, an estimated 80 percent failed to produce new growth. It is impossible to determine what part this disease might have had in the failure of the plants to recover after the first cutting. However, the fungus was found in abundance on plants that had not been cut. These plants were discolored brown near the stem bases and some stems were dead. Laboratory examinations showed plants in progressive stages of the disease. -- PLANT PATHOLOGY DEPARTMENT, LOUISIANA STATE UNIVERSITY, BATON ROUGE, LOUISIANA

BLACK SCALE DISEASE ON BULBS OF LILIUM UMBELLATUM ERECTUM

By W. D. McClellan

Several years ago Colletotrichum lilii Plakidas, the causal agent of black scale disease of Lilium longiflorum Thunb., was brought into the greenhouses at the Plant Industry Station, Beltsville, Maryland on some Easter lily bulbs of the variety Creole from Louisiana. Progeny of these bulbs have been grown in soil in pots in the greenhouse at Beltsville and have remained infected. Before repotting in the fall the bulbs have been soaked for 24 hours in water in cans to hasten growth. Other lily species have also been soaked in clean water in these same cans. This year bulbs of L. umbellatum erectum were heavily infected. Typical dark brown lesions containing the setose acervuli were present on the outer bulb scales. This is the first report of C. lilii affecting a species of lily other than L. longiflorum. -- DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

FUNGUS CAUSING WATERMELON WILT: A CORRECTION

By D. M. Coe and W. J. Hooker

In the December 15, 1946, issue of the Plant Disease Reporter, page 462, Fusarium wilt of watermelon was reported as being caused by Fusarium oxysporum f. melonis. This would lead to the conclusion that the disease was induced by the fungus which causes wilt of cantaloup and casaba, whereas it was the watermelon wilt fungus, Fusarium oxysporum Schlecht. f. niveum (E. F. Sm.) Snyder & Hansen, that was meant. The writers accept full responsibility for this error and wish to make this correction. -- IOWA AGRICULTURAL EXPERIMENT STATION AND IOWA EXTENSION SERVICE, AMES, IOWA

CHECK LIST REVISION

Freeman Weiss

ALETRIS (LILIACEAE)

ALETRIS AUREA Walt. (1) and A. FARINOSA L. (2), STAR-GRASS, YELLOW COLIC-ROOT. Perennial herbs, (1) of the Southeastern States, (2) ranging from Me. to Minn., Fla. and Tex.; sometimes grown in wild gardens.

Gloeosporium aletridis P. Henn., leaf spot. Miss.
Puccinia aletridis Berk. & Curt. (II,III). Fla., Miss., S.Car., Tex. (1); Del., Ill., Ind., Mass., N.J., N.Car., R.I., Tenn., Wis. (2). O and I unknown.

ALLIUM (LILIACEAE)

ALLIUM ASCALONICUM L., SHALLOT (1), and other esculent spp. (except A. cepa) as A. PORRUM L., LEEK (2); A. SATIVUM L., GARLIC (3); and A. SCHOENOPRASUM L., CHIVES (4). Biennial or perennial herbs of Europe and Asia, grown in gardens for edible stems and leaves used for seasoning. Field culture of garlic chiefly in La. and Tex.; bulblets for propagation ("cloves") are produced in Calif. and the Pacific Northwest. The plant grown as shallot in La. and Tex. may be a form of A. cepa but is commonly reported under the above name.

Alternaria porri (Ell.) Cif., purple blotch. La., Tex., P.R. (1); Conn., La., N.J., N.Y. (2); Ida., La., Tex. (3).
Aspergillus niger v. Tiegh., black mold. Calif., Ohio, Tex. (3); occasional in markets
Botrytis allii Munn, gray-mold neck rot. La. (1); N.J. (2); Calif., La., Tex. (3)
Colletotrichum circinans (Berk.) Vogl., smudge. Ill., La., Wis. (1); Ill., Wis. (2)
Cuscuta sp., dodder. Wis. (3)
Diplodia natalensis Pole-Evans, dry rot. Tex. (3)
Ditylenchus dipsaci (Kuehn) Filip., stem nematode. Calif. (3)
Erwinia carotovora (L.R.Jones) Holland, soft rot. Ga. (2); Ga., La., Tex. (3)
Fusarium sp., wilt. N.J. (2). Dry rot. Tex., occasional in markets (3)
F. oxysporum Schlecht. f. cepae (Hanz.) Snyder & Hansen, bulb rot. Ida. (3)
F. solani (Mart.) App. & Wr. (F. malli Taub.), pink root (secondary). Conn., Tex. (3)

Allium ascalonicum etc. cont.

Helminthosporium allii Campanile, canker, dry rot. La., N.Mex., Tex. (3)

Heterodera marioni (Cornu) Goodey, root knot. ?Fla., Tex. (1); ?Fla. (2)

Heterosporium allii Ell. & G.Martin var. allii-porrii Sacc. & Berl., on leaves. Pa. (2)

Macrophomina phaseoli (Maub.) Ashby, charcoal rot. Tex. (3)

Penicillium sp., blue-mold rot. Calif., Tex. (3); occasional in markets

Peronospora destructor (Berk.) Casp., downy mildew. La. (1); Calif., ?Conn., La. (2); Calif. (4)

Phoma terrestris Hansen, pink root. Colo., La., Tex. (1); La. N.Mex., N.Y. (2); Calif., Colo., Conn., La., N.Mex., Tex. (3)

Puccinia porri (Sow.) Wint. (II,III), rust. Calif. (3); Conn., N.Y., Wash. (4). O and I occur on cultivated Allium spp. but have not been found in America.

Sclerotium cepivorum Berk., white rot. La., Va. (1); Ore., Va. (2); Calif., La., Ore., Tex. (3). This has been published as Stromatinia cepivorum (Berk.) Whet. although no apothecial stage has been observed.

S. rolfsii Sacc., southern blight. La. (1); Ga., La., Tex. (3)

Stemphylium botryosum Wallr., black stalk rot, tip blight, seed mold. Conn., N.J., Wash. (2); Ark., Calif., La., N.H., Tex., Wash. (3)

Trichoderma viride Pers. ex Fr., green-mold rot. Tex. (3)

Urocystis cepulae Frost, smut. Mass. (1); Mass., N.Y. (2) (resistant); Mass., N.Y. (3); Mass. (4)

Mosaic -- unidentified virus(es). La., Tex. (1); Calif., Ore., Tex., probably general (3); also on A. ampeloprasum L., Spanish garlic, in La. and Ore. These viruses resemble onion yellow-dwarf virus (Marmor cepae Holmes, Allium virus 1 K.M. Sm.) but may be special strains.

Yellows (yellow chlorosis, stripe) -- suspected virus different from yellow dwarf, perhaps aster yellows. La., Tex. (1, 3)

Blast (inflorescence blight, failure to form seed or bulblets) -- cause unknown, attributed to weather factors; sometimes associated with root rot. Conn., Ida. (3)

Waxy breakdown -- cause unknown, presumed physiological. Frequent in markets.

ALLIUM CEPA L., ONION (1). Biennial of southwestern Asia, universally cultivated for food. The principal commercial production areas in the U.S. are Tex., La., Okla. and Calif. for spring (green) onions; N.J. for intermediate season; N.Y., Mich., and other North Central States, Colo., Calif. and the Pacific

Allium cepa cont.

Northwest for late summer (storage) onions. Besides numerous horticultural types, two subspecies or botanical vars. are grown: A. C. var. SOLANINUM Alef., POTATO or MULTIPLIER ONION (2), and var. VIVIPARUM Metz, TOP O. (3). A. FISTULOSUM L., WELSH or SPANISH ONION (4) is cult. for its leaves, useful in seasoning; it is also used in onion breeding.

Acrothecium melanopus (Schw.) Sacc., on stalks. Pa. Perhaps a Curvularia

Alternaria porri (Ell.) Cif. (A. allii Nolla), purple blotch. Me. to Miss., Tex., and Minn.; also Colo.,Utah, P.R. (1); Md. (4). Reported to cause bulb rot in Colo.; usually associated with and perhaps a significant factor in "blight" as reported in Tex. The Alternaria comb. has been made by several authors -- this appears to be the earliest.

A. tenuis Nees ex Cda., secondary leaf and seed mold. General (1)

Aspergillus niger v. Tiegh., black-mold rot. General in markets and storage,especially in Tex. and Calif., associated with immaturity and wet weather (1).

Botrytis spp., neck rot, gray-mold rot, leaf blight. Three forms caused by different spp. have been distinguished but reports often fail to discriminate between them; available records indicate the following distribution: B. allii Munn, gray-mold neck rot. N.H. to Fla., Tex., and Minn.; also Calif., Colo., Ida., Ore., Wash. (1). B. byssoidea Walker, mycelial neck rot. Conn., Ida., Ill., Ind., Mass., N.Y., Wis. (2). B. cinerea Pers. ex Fr., reported as gray-mold blight of foliage in Calif., La., Fla. and Wash.,perhaps confused with preceding spp. in some instances. B. squamosa Walker, small sclerotial neck rot. Fla., Ida., Ill., Ind., La., Me., Mass., N.Y., Ohio, Tex., Wis. (3)

Cercospora sp., leaf spot (? secondary). Tex. (1)

Colletotrichum chardonianum Nolla, leaf spot. P.R. (1)

C. circinans (Berk.) Vogl., smudge. General in the Eastern and Central States to Fla., Tex., and Colo. (1).

Curvularia lunata (Wakker) Boed., on leaves. Calif. (1)

Cuscuta spp., dodder. Calif., Del., Ida., Ill., N.Y., Tex., Wash., Wis. (1). C. gronovii Willd., N.Y. (1)

Diplodia natalensis Pole-Evans, Diplodia dry rot. Tex., P.R. (1). Conidial stage of Physalospora rhodina (Berk. & Curt.) Cke.

Ditylenchus dipsaci (Kuehn) Filip., bloat, bulb nematode. N.Y., Tex. (1)

Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Reported widespread in fields transit, and storage, following bruises, sunscald, and frost damage (1). Probably more or less confused with Pseudomonas alliicola, q. v.

Fusarium spp., root rot, basal bulb rot (in field and storage). Eastern and North Central States westward, especially in

Allium cepa cont.

(Fusarium)

irrigated districts as Colo., Calif., and Wash. (1). Numerous forms, all referable to F. oxysporum Schlecht. in the sense of Snyder & Hansen, may cause one aspect or another of this disease. In this classification the predominant forms are identified as F. oxysporum f. cepae (Hanz.) Snyder & Hansen. In other classifications they are distinguished as F. zonatum (Sherb.) Wr. f. 1 and f. 2 Link & Bailey (= F. vasinfectum Atk. var. zonatum f. 1 and f. 2) and F. cepae Hanz. (= F. oxysporum f. 7 Wr.). Besides these, forms usually designated as F. bulbigenum Cke. & Mass. and other variants of F. oxysporum in the broad sense, and also some strains of F. moniliforme Sheld. may cause similar bulb rots though usually not typical basal rot. Occasionally forms of Fusarium broadly referable to F. solani (Mart.) App. & Wr. and to F. roseum Lk. in the sense of Snyder & Hansen, when associated with bacteria, cause onion bulb rots but are typically saprophytic.

Fusarium spp., pink root, root rot. Widely reported (Calif., Colo., Conn., Ida., Mass., N.Y., Tex., Wash.) in this association but not discriminated from pink root caused by Phoma terrestris, typically the primary cause. Specifically identified these Fusaria belong to F. solani (F. malli Taub.) or to F. bulbigenum (= F. oxysporum sensu latu) and usually do not cause bulb rot.

Heterodera marioni (Cornu) Goodey, root knot. Ariz., Conn., Fla., Ind., N.Y., Ohio, Tex. (1): ? Fla. (4)

Heterosporium allii Ell. & G. Martin, leaf spot. Calif., Colo., Wash. (1). Host relationship suggests this is H. a. var. cepivorum Nicolas & Aggéry

Macrophomina phaseoli (Maub.) Ashby, charcoal rot (bulbs). Calif., Tex. (1)

Macrosporium spp., purple blotch, black stalk rot. For M. porri Ell. see Alternaria porri; for M. parasiticum Thuem. (= M. sarcinula Berk.) see Stemphylium botryosum

Mycosphaerella allicina (Fr.) Vest., on leaves. Wis. (1)

Penicillium spp., blue-mold rot. Frequent in transit and storage following mechanical and other injuries

Peronospora destructor (Berk.) Casp., downy mildew. General (1)

Phoma terrestris Hansen, pink root. Widespread, especially in Calif., Colo., La., Tex.; and locally in Ida., Ind., Iowa, Mass., Mich., N.Y., Ore. (1)

Phyllosticta allii Tehon & Daniels, leaf spot. Ill. (1)

Phytophthora drechsleri Tucker, root rot. Hawaii (1)

Pleospora herbarum (Pers. ex Fr.) Rabh. (P. allii (Klotzsch) Ces. & De Not.), on leaves. Calif. (1). Ascigerous stage of Stemphylium botryosum, q. v.

Pseudomonas alliicola Burk., bacterial rot. Mass., N.Y., Wash.; perhaps Ind., Md., Ohio, as "heart rot", and elsewhere (1), but confused with Erwinia carotovora.

Allium cepa cont.

Puccinia asparagi DC. (O,I,II,III), rust. Calif. (1); Conn., Iowa, Kans., Minn., Nebr., Wis. (3). Only the O and I stages have been reported in natural collections.

P. porri (Sow.) Wint. (II,III), rust. Calif., Conn. (1); Conn., Nebr. (3). O and I occur on Allium spp. but have not been found in America.

Pythium spp., damping off, root rot. Ida., Mass., N.Y., N.Car. (1). P. spinosum Saw. and P. ultimum Trow are reported in this connection in Calif.

Rhizoctonia solani Kuehn, damping off, root rot. Occasional, reported in Colo., Ida., Ind., Ohio, Wash., P.R.

Rhizopus stolonifer (Ehr. ex Fr.). Lind, mushy rot, following sunscald or freezing. Ind., Mass., Tex. (1).

Sclerotinia sclerotiorum (Lib.) D By., watery soft rot. Calif., Fla., Ida., Mich., Ohio, W.Va. (1). Probably confused with Botrytis rot in some instances.

Sclerotium cepivorum Berk., white rot. Calif., Ky., La., N.J., Ohio, Ore., Pa., Tex., Va. (1); Ore., Va. (4). See note under A. ascalonicum

S. rolfsii Sacc., southern blight. Ala., Calif., Ga., N. and S. Car., Okla., Tex. (1)

Stemphylium botryosum Wallr., black stalk rot. General, usually following downy mildew or purple blotch; also on seed (1)

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot (secondary). Tex. (1)

Urocystis cepulae Frost, smut. General (1); Mass., N.Y. (4)

Yellow dwarf -- virus (Marmor cepae Holmes, Allium virus 1 K.M. Sm.). Calif., Iowa, Ky., Minn., Ore., Tex., W.Va., Wis. (1); Ky., W.Va. (2); N.Y. (3)

Yellows -- virus (Chlorogenus callistephi Holmes, Callistephus virus 1 K.M.Sm.). Calif., Me., Mass., Minn., Tex., Wis., ? Ore. (1). Some forms of yellows may be of physiological origin.

Blast (of inflorescence) -- cause indefinite, usually attributed to physiological or environmental factors but various fungi associated, insect damage also involved. Typically in northern districts, as Conn., Ida., Mass., N.H., N.Y., Ohio, Wash.

Blight -- variously used term, here restricted to a foliage disease especially reported in Tex., of undetermined cause but commonly following purple blotch (Alternaria porri).

Chlorosis -- mineral deficiency, e. g. of copper in muck soils in N.Y. and Fla.; of manganese in N.Y. and R.I.

Scald -- physiological, attributed to high temperature, usually with excessive moisture, at approach of maturity. General in summer onion districts.

Allium cepa cont.

Stain (alkali spot) -- scale discoloration, occasional in transit or storage, caused by contact with alkaline materials in bags or ammonia fumes.

Top blight, white blast -- various causes, commonly due to thrips (Thrips tabaci Lindeman); sometimes an early stage of downy mildew or purple blotch. General.

ALLIUM spp., WILD ONION, WILD GARLIC, etc. Numerous bulbous herbs widely distributed in the humid parts of N. America. Some are of ornamental value, chiefly in rock and wild gardens as A. ACUMINATUM Hook. (1) and A. VALIDUM S. Wats. (2); some are of significant forage value and furnish food for wildlife as A. CERNUUM Roth (3) and A. NUTTALLII S. Wats. (4); A. CANADENSE L. (5) furnishes garlic oil, used medicinally; A. VINEALE L. (6) is a pernicious weed.

Colletotrichum sp. (? liliacearum Ferr.), on old leaves. Reported from Mich., Nebr., and Tex. as Vermicularia liliacearum West.; perhaps cosmopolitan.

Heterosporium allii Ell. & G. Martin, leaf spot. Md., N.Y., Pa., Tex., Wis. (5); Del., Ill., N.J., Tex. (6)

H. iridis (Fautr. & Roum.) Jacques, leaf spot. Pa. (5)

Phoma allicola Sacc. & Roum., on leaves. Wis. (5)

P. terrestris Hansen, pink root. N. & S.Dak. (3); Tex. (5)

Puccinia blasdalei Diet. & Holw. (O,I,II,III), rust. Ida., Ore., Utah, Wash. (1); Colo., Wyo. (3)

P. granulispora Ell. & Gall. (O,I,II,III), rust. Ida., Mont., S. Dak. (3)

P. mutabilis Ell. & Gall. (O,I,II,III), rust. Utah (1); Colo. (4)

Pythium paroecandrum Drechs., root-tip rot. Va. (6)

Sclerotium cepivorum Berk., white rot. La. (5)

Septoria viridetingens Curt., leaf spot. On A. tricoccum Ait., Md., N.Y., N.Dak., Tenn., Wis.

Uromyces aemulus Arth. (O,I,II,III), rust. Colo., Utah (1); Calif., Nev., Ore. (2)

U. aureus Diet. & Holw. (O,I,III), rust. Calif. (2)

U. bicolor Ell. (O,I,II,III), rust. Calif., Ida. (2); Mont. (4); Mass., Mo., N.Y., Tex. (5)

U. sporoboli Ell. & Ev. (O,I), rust. Mo., Nebr., Tex. (5). II and III on Sporobolus spp.

Yellow dwarf -- virus (Marmor cepae Holmes, Allium virus 1 K.M. Sm.). Tex. (5, 6)

ALOE (LILIACEAE)

ALOE spp., ALOE. Perennial succulent herbs mostly of African origin, grown for ornament as pot plants and for bedding out in warm

Aloe cont.
regions.

Pythium ultimum Trow, root rot. On A. variegata L., in Calif.

ASPARAGUS (LILIACEAE)

ASPARAGUS ASPARAGOIDES Wight, "SMILAX" of florists. Tuberous-rooted vine of S. Africa grown under glass for decorative greens.

Botrytis cinerea Pers. ex Fr., gray-mold blight. Alaska.
Fusarium sp., stem rot. N.J.
Stagonospora smilacis (Ell. & Hart.) Sacc., leaf spot. Wis.

ASPARAGUS OFFICINALIS L., ASPARAGUS. Perennial of seacoasts of Europe and Asia, long cult. for edible young shoots; the cult. form distinguished as var. ALTILIS L. Grown in gardens and for local fresh market throughout the U. S., commercially principally in Calif., N.J., S.Car., Ill., and Wash.

Alternaria sp., probably A. tenuis Nees ex Cda., branchlet blight, dieback (probably secondary). Ill., Mass., N.J., N.Y., Okla., S. Car., Va. Reported also as A. fasciculata (Cke. & Ell.) L. R. Jones & Grout, also as Macrosporium commune Rabh. See also Stemphylium botryosum.
Armillaria mellea Vahl ex Fr., root rot. Oreg.
Ascochyta sp. (? Ascochytula asparagina Petr.), on stems, Del.; branchlet blight, Tex.
Botrytis cinerea Pers. ex Fr., gray-mold shoot blight (field), stem rot (market). Calif., Ill., Mass., N.Y., W.Va.
Cercospora asparagi Sacc. (C. caulicola Wint.), leaf (branchlet) spot. Md. to Fla., Tex., and Nebr.; also Calif., N.Mex., Hawaii
Cladosporium herbarum Lk. ex Fr., on dead stems and branchlets. Cosmopolitan.
Colletotrichum sp., on stems, ? anthracnose, canker. Ala., Conn., Ill., S.Car., Tex., Va., P.R.; on roots, Ore. C. liliacearum (Schw.) Ferr. (commonly reported as Vermicularia l. West. and perhaps a synonym of C. dematium (Pers. ex Fr.) Grove) is common on dead stems, often following rust; the relation to reputed pathogenic Colletotrichum spp. unknown.
Confertopeltis asparagi Tehon, on dead stems. Ill.
Diplodia asparagi Pk., on stems, N.Y.; stem rot, Tex. Ascochytula asparagina?
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. General in markets, occasional in fields. Bacterial root rot of undetermined identity reported in Ky. and Ore.

Asparagus officinalis cont.

Fusarium spp., root and stem rot, wilt (in fields); Fusarium rot, moldy tip (in markets). General. Specific determinations lacking or doubtful in most reports: F. culmorum (W.G.Sm.) Sacc., reported in Ill.; F. semitectum Berk. & Rav. in S.Car. and W.Va. -- both are synonyms of F. roseum Lk. emend. Snyder & Hansen; F. oxysporum Schlecht. f. asparagi Cohen in Calif., also identified in S.Car., Wash., and ? N.J.; F. moniliforme Sheldon in S.Car. and P.R.

Gibberella saubinettii (Mont.) Sacc. (? G. pulicaris (Fr.) Sacc.), on stems. Del., Ind., Va., W.Va.

Heterodera marioni (Cornu) Goodey, root knot. ? S.Car.

Macrophoma lanceolata (Cke. & Ell.) Berl. & Vogl. (Dothiorella l. (Cke. & Ell.) Petr.), on stems. N.J.

Macrophomina phaseoli (Maub.) Ashby, ashy stem blight. Tex.

Penicillium spp., blue-mold rot. Occasional in markets, also secondary root rot in Calif. and Ore.

Phoma spp., on stems, ? canker. Variously reported as P. asparagi Sacc. (= Phomopsis asparagi (Sacc.) Bub.) in Ala., Ark., N.J.; P. asparagina Tehon & Stout in Ill.; P. media Ell. & Ev. in Ill., Kans., N.Y., Calc; P. microspora Berk. & Curt. in S.Car.. Associated and probably connected with different ascigerous forms reported as Diaporthe sp., N.Dak.; Leptosphaeria conatella (Cke. & Ell.) Sacc., N.J., N.Y.; Metasphaeria asparagi Tehon & Stout, Ill. See also Ascochytula and Macrophoma.

Phytophthora sp., stem rot. Calif.

Pleospora herbarum (Pers. ex Fr.) Rab. (P. asparagi Rab.), on stems. Ascigerous stage of Stemphylium botryosum q. v.

Puccinia asparagi DC. (O,I,II,III), rust. General on susceptible varieties.

Rhizoctonia crocorum DC. ex Fr., root rot. ? Calif.

R. solani Kuehn, stem canker, damping off. Occasional in fields; sometimes red stain of stalks in markets.

Sclerotinia sclerotiorum (Lib.) D By., watery soft rot. Occasional in the South.

Stemphylium botryosum Wallr., secondary branchlet blight or saprophytic on stems and seed. General. Conidial stage of Pleospora herbarum.

Vermicularia liliacearum West. See Colletotrichum

ASPARAGUS PLUMOSUS Baker, ASPARAGUS-FERN. Erect to climbing perennial of S. Africa grown widely under glass for decorative greens, and also in lath shelters in Fla., Calif., and Tex.

Ascochytula asparagina Petr., stem canker, blight. Fla., Tex. See also Didymosphaeria brunneola

Cercospora asparagi Sacc., on branchlets. Fla.

Cladosporium sp., leaf mold, associated with yellowing and dropping of leaflets. Fla., Miss., Tex.

Asparagus cont.:
Colletotrichum sp., on stems. Fla.
Didymosphaeria brunneola Niessl, on stems. Fla. Said to be the ascigerous stage of Ascochytula asparagina.
Fusarium sp., root rot, wilt. Fla., Wash.
Helminthosporium sp., on branchlets. Fla.
Hendersonia asparagi Pass., on stems and branchlets. Fla.
Heterodera marioni (Cornu) Goodey, root knot. Fla.
Leptosphaeria asparagina Karst., on stems. Fla.
Phoma sp., on stems, ? canker. Fla.

"Rust" -- cause not determined but apparently complex, probably involving environmental factors (excessive humidity), physiological (aging and exhaustion of plants), and weakly parasitic fungi. Fla.

ASPARAGUS SPRENGERI Regel, SPRENGER ASPARAGUS. Tuberous-rooted vine of S. Africa, grown in greenhouses for decorative greens.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn., crowngall, ? fasciation. Fla., Ore. The causal organism may have been Corynebacterium fasciens (Tilford) Dowson but was reported as indicated.
Heterodera marioni (Cornu) Goodey, root knot.
Rhizoctonia solani Kuehn, root rot. N.Y.

ASPIDISTRA (LILIACEAE)

ASPIDISTRA ELATIOR Blume (A. lurida Hort.), ASPIDISTRA. Perennial of China, commonly grown as a house and conservatory plant.

Ascochyta aspidistrae Mass., leaf spot. Minn., N.J.
Colletotrichum omnivorum Hals. (? C. liliacearum Schw.) Ferr.), leaf spot. Calif., Mo., N.J., Pa., W.Va.
Labrella aspidistrae Tehon & Daniels, leaf blight. Ill., La.

BRODIAEA (LILIACEAE)

BRODIAEA spp., especially B. CAPITATA Benth. (1), B. DOUGLASII S. Wats. (2), B. IXIOIDES S. Wats. (3), B. PULCHELLA (Salisb.) Greene (4), and others (5). Cormous herbs of open ground, chiefly in the Pacific Coast States, sometimes grown in wild gardens. The genus has been much subdivided by some authorities but here includes Dichelostemma, Hookera, Triteleia, etc.

Puccinia carnegiana Arth. (0,I,III), rust. Ariz. (5)
P. dichelostemmae Diet. & Holw. (0,I,III), rust. Wash. (2); Ore.,

Brodiaea cont.
Wash. (4); Calif. (5)
P. moreniana Dudl. & C. H. Thompson (III), rust, Calif. (1)
P. nodosa Ell. & Harkn. (O,I,II,III), rust, Calif. (1)
P. pattersoniana Arth. (O,I), rust. Ida., Utah, Wash. (2). II and III on Agropyron and Elymus.
P. subangulata Holw. (O,I,III), rust, Wash. (4)
Uromyces brodiaeae Ell. & Harkn. (O,I,III), rust. Ore. (2); Calif. (3); Calif., Wash. (5)
Stagonospora cylindrocarpa (Ell. & Ev.) Sacc., on stems. Wash. (5)

CALOCHORTUS (LILIACEAE)

CALOCHORTUS spp., MARIPOSA, GLOBE-TULIP. Numerous spp. of showy-flowered, cormous herbs of mountain meadows, slopes and open woods chiefly in the Pacific Coast States; some ranging eastward on the Plains. Grown in gardens or flowered indoors as pot plants.

Puccinia calochorti Pk. (O,I,III), rust. On many spp. in Calif., Ore. and Wash. to Nebr. and N.Mex.

CAMASSIA (LILIACEAE)

CAMASSIA spp., CAMASS, especially C. LEICHTLINII S.Wats. (1), and C. QUAMASH (Pursh) Greene (2) -- bulbous herbs of mountain meadows in the Pacific Northwest and Calif.; also C. SCILLICIDES (Ref.) Cory (3) of the Eastern and Central States. The bulbs furnish food for wildlife and are sometimes planted for the showy flowers.

Botrytis cinerea (Pers. ex Fr.), Botrytis blight. Ore. (1)
Septoria chlorogali (Cke. & Harkn.) Sprague, leaf spot. Ore. (1)
Urocystis colchici (Schlecht.) Rab., leaf smut. Ore. (2), Ind. (3)

CHLOROGALUM (LILIACEAE)

CHLOROGALUM POMERIDIANUM Kunth., AMOLE, SOAP-PLANT (1); also CHLOROGALUM spp. (2). Bulbous herbs of dry open ground in Calif., sometimes grown for ornament.

Heterosporium gracile Sacc., leaf spot. Calif. (2)
Mycosphaerella chlorogali Fairm. on stems. Calif.
Pleospora chlorogali Fairm. (? P. herbarum (Pers. ex Fr.) Rab.), on stems. Calif.

CHLOROGALUM cont.
Septoria chlorogali (Cke. & Harkn.) Sprague, on stems. Calif.
Uromyces aureus Diet. & Holw. (O,I,III), rust. Calif.

CLINTONIA (LILIACEAE)

CLINTONIA BOREALIS (Ait.) Raf., YELLOW CLINTONIA (1) and C. UNIFLORA (Schult.) Kunth., QUEEN-CUP (2). Rhizomatous herbs of moist woods, (1) in the Northeastern and North Central States, (2) in the Pacific Northwest; sometimes grown in wild gardens.

Puccinia mesomajalis Berk. & Curt. (III), rust. Mich., Minn., N.H., N.Y., Tenn., Va., Wis. (1); Calif., Ida., Mont., Ore., Wash. (2)
Synchytrium aureum Schroet., false rust. Wis. (1)

COLCHICUM (LILIACEAE)

COLCHICUM AUTUMNALE L., AUTUMN-CROCUS. Cormous herb of Europe and N.Africa cult. for ornament.

Colletotrichum liliacearum (Schw.) Ferr., on old leaves. Del.
Urocystis colchici (Schlecht.) Rab., leaf smut. Del., N.Y., Ohio, Pa., Wash.

CONVALLARIA (LILIACEAE)

CONVALLARIA MAJALIS L., LILY-OF-THE-VALLEY. Rhizomatous herb of Europe and Asia, widely grown in gardens and locally naturalized in the Eastern States; also flowered commercially under glass from imported pips.

Ascochyta majalis Massal., leaf blotch. Pa.
Botrytis paeoniae Oud. (? B. cinerea Pers. ex Fr. f. convallariae Kleb.), rhizome rot, gray-mold blight. Ill., Me., Pa.
Cercospora sp., on leaves. S.Car.
Gloeosporium convallariae Allesch., leaf spot. N.Y.
Heterodera marioni (Cornu) Goodey, root knot. Occasional in imported pips.
Kabatiella microsticta Bub., leaf spot (? secondary). Md.
Phyllosticta sp., leaf spot. N.J., N.Y.
P. vagans Pk., on leaves. Va.
Pratylenchus pratensis (DeMan) Filip., root nematode. Occasional in imported pips and associated with forcing failures.
Sclerotium rolfsii Sacc., southern blight. Md.

CORDYLINE (LILIACEAE)

CORDYLINE spp., especially C. TERMINALIS Kunth., DRACAENA. Palm-like shrub of E. Asia, grown for ornament in the open in warm regions but more commonly as a pot plant indoors. See also Dracaena spp., plants of both genera being known under this name in horticulture.

Cladosporium dracaenatum Thuem. (? C. herbarum Lk. ex Fr.), on leaves. S.Car.
Glomerella cincta (Berk. & Curt.) Spauld. & Schrenk., leaf spot. N.J.
Phyllosticta dracaenae P. Henn., leaf spot. Ohio, Pa. P. maculicola Hals. N.J., P.R.
Phytophthora spp., root rot. N.J.

DASYLIRION (LILIACEAE)

DASYLIRION WHEELERI S.Wats., SOTOL (1), and other spp. (2). Robust woody perennials of arid plains in the Southwest; grazed by cattle and wildlife, and various parts used by aborigines in basketry and for food and drink.

Botryosphaeria dasylirii (Pk.) Theiss. & Syd., on leaves. Ariz., N.Mex. (1)
Coniothyrium concentricum (Desm.) Sacc. and C. hysterioideum Karst. & Hariot, on leaves. Tex. (2)

DIANELLA (LILIACEAE)

DIANELLA spp. Rhizomatous perennials of southern Pacific islands, sometimes grown for ornament.

Meliola gregoriana F.L.Stevens, black mildew. Hawaii.

Mosaic -- unidentified virus. Hawaii.

DRACAENA (LILIACEAE)

DRACAENA spp. Palm-like shrubs and trees of Africa grown for ornament, sometimes in the open in warm regions, more commonly as pot plants indoors. Horticultural Dracaenas also include Cordyline, q.v.

Glomerella cincta (Ston.) Spauld. & Schrenk., leaf spot, tip blight. Fla., La., N.J., Pa., P.R.; probably general. Usually

Dracaena cont.
in the conidial stage and reported as Colletotrichum or Gloeosporium sp.
Heterodera marioni (Cornu) Goodey, rootknot. Fla.
Lophodermium dracaenae Phil & Harkn. (Dermascia d. (Phil. & Harkn.) Tehon) on leaves. Calif.
Meliola dracaenae F. L. Stevens, black mildew. Hawaii
Phyllosticta spp., leaf spot. P. draconis Berk., Pa.; P. maculicola Hals., Mass., N.J., P.R.
Physalospora dracaenae Sheldon, on leaves. W.Va.

EREMURUS (LILIACEAE)

EREMURUS ROBUSTUS Regel. Hardy perennial of central Asia, grown for ornament

Myrothecium roridum Tode ex Fr., leaf spot. Ohio

ERYTHRONIUM (LILIACEAE)

ERYTHRONIUM spp., ADDERS-TONGUE, TROUT-LILY. Bulbous herbs of woodlands, native to cooler parts of the U.S. as E. albidum Nutt. (1) and E. AMERICANUM Ker-Gawl (2) in the Eastern States, and E. GRANDIFLORUM Pursh (3) and E. MONTANUM S.Wats. (4) in the northern Rocky Mountain and Pacific Coast States; grown in wild-gardens and rockeries.

Asteroma tenerrimum Grogn. var. erythronii Sacc., black spot. Ida., Mont., Wash. (3)
Botrytis sp., Botrytis blight. Ill. (1); N.Y., Vt. (2); Wash. (3,4)
Ciborinia gracilis (Clements) Whet., leaf blight. Ill., Nebr. (1)
C. erythronii Whet. N.Y. (2)
? Protomyces erythronii Pk., on petioles and leaves. Mass., N.Y. (2)
Sclerotium sp., on bulbs. Calif.
Urocystis erythronii Clint., leaf smut. Conn., N.Y. (1,2)
Uromyces heterodermus Syd. (O,III), rust. Calif., Colo., Ida., Mont., Utah, Wash., Wyo. (3); Ore., Wash. (4)
Ustilago beufleri Fckl., smut. Mo. (1); Del., Md., Mich., Mo., N.J., N.Y., Pa. (2)

FRITILLARIA (LILIACEAE)

FRITILLARIA spp., FRITILLARY. Bulbous herbs, several spp. of which occur in meadows and open woods in the Pacific Coast States to Utah and Mont., and may be grown for ornament; other spp. of Europe and western Asia also are grown in gardens.

Phyllosticta fritillariae Bonar & W. B. Cooke, leaf spot. Calif. On F. atropurpurea Nutt.
Uromyces miurae Syd. (III), rust. On F. kamtschatcensis Ker-Gawl in Alaska, F. lanceolata Pursh, Wash.

Mosaic -- undetermined virus. N.Y. F. pudica (Pursh) Spreng. has been shown susceptible to artificial inoculation with cucumber mosaic and lily mottle viruses, Marmor cucumeris Holmes and M. tulipae Holmes.

GALTONIA (LILIACEAE)

GALTONIA CANDICANS DECNE., SUMMER HYACINTH. Flowering bulb of S. Africa, grown for ornament.

Mosaic -- virus (Marmor scillearum F.F.Sm. & Brierley) Ore.

HEMEROCALLIS (LILIACEAE)

HEMEROCALLIS spp., DAYLILY. Hardy perennial herbs of Europe and Asia, grown for ornament. H. FULVA L., TAWNY D. (1) is locally naturalized in the Eastern States; the modern daylilies of gardens belong to various spp., as H. citrina Baroni, H. flava L., H. aurantiaca Baker, H. thunbergii Baker and others native to E. Asia.

Botrytis sp., leaf spot, gray mold blight. Md.
Cercospora hemerocallis Tehon, leaf spot. Ill. (1)
Colletotrichum liliacearum (Schw.) Ferr. (? C. dematium (Pers. ex Fr.) Grove), on dead stems. Ala., Md., Mass., N.H., N.Y., Pa., probably cosmopolitan. Usually reported as Vermicularia liliacearum Schw. (1831) or V. liliacearum West. (1866), considered to belong rather to Colletotrichum by several authors but first so published by Ferraris (1902), later as a combination based on Westendorp's sp. by Duke (1928); the indicated combination though arbitrary is historically correct.
Heterodera marioni (Cornu) Goodey, root knot
Heterosporium gracile Sacc., leaf spot. N.J. (1)
Kabatiella sp. (? microsticta Bub) leaf blight (? secondary). Md.
Phomopsis achilleae (Sacc.) Hoehn., on dead scapes. Hawaii

Hemerocallis cont.
Sclerotium sp., root rot. Ind.

HOSTA (LILIACEAE)

HOSTA spp., PLANTAIN-LILY. Hardy perennial herbs of eastern Asia (?) grown for ornamental foliage and flowers.

Alternaria sp., leaf spot. N.Y.
Botrytis cinerea Pers. ex Fr., crown rot. Alaska, N.J.
Colletotrichum omnivorum Hals., (? C. liliacearum (Schw.) Ferr.), on petioles and scapes. Conn., N.J., Va.
Rhizoctonia solani Kuehn, root rot. N.J.
Sclerotium delphinii Welch, crown rot. Conn., Minn., N.J., N.Y.
S. rolfsii Sacc., Md.
Phyllosticta sp., leaf spot. N.J.

HYACINTHUS (LILIACEAE)

HYACINTHUS ORIENTALIS L., COMMON HYACINTH, including var. ALBULUS Baker, ROMAN H. of florists. Bulbous herb of the Mediterranean region, widely grown for ornament, indoors as a pot plant, in the open as a hardy spring bulb, chiefly from imported stocks.

Ditylenchus dipsaci (Kuehn) Filip., bulb nematode, ring disease. N.J., Wash.
Erwinia carotova (L.R.Jones) Holland, bacterial soft rot. Cosmopolitan, reported from Calif., Mich., N.J., N.Y., Ohio, Wash.
Fusarium sp. (? F. bulbigenum Cke. & Mass.), bulb rot. Colo., Mo., N.J., R.I., Wash.
Botrytis sp., gray mold (following frost injury) N.Car.
Penicillium spp., blue-mold rot, scale blemishes. Cosmopolitan. P. corymbiferum Westling and P. hirsutum Dierckx have been identified as causing bulb rot.
Phytophthora sp., root rot. N.J.
Sclerotinia bulborum (Wakk.) Rehm, black slime. Reported on imported bulbs grown in U.S. in former years, no authentic records now available; rarely observed in Europe at present though formerly recorded as destructive.
Xanthomonas hyacinthi (Wakk.) Dowson, yellows. Occasional in imported bulbs, reported from Mass., Mich., Minn., N.J., Wash.

Mosaic -- virus (in part Marmor scillearum F. F. Smith & Brierley, identified in Ore.; in part unidentified). Reported in Calif.,

Hyacinthus cont.
Md., N.Y., Wash., probably widespread but not commonly noted. This host also shown susceptible to cucumber mosaic virus.

KNIPHOFIA (LILIACEAE)

KNIPHOFIA spp., especially K. UVARIA Hook., TORCH-LILY, POKER-PLANT. Perennial herbs of Africa, grown for ornament.

Alternaria sp., leaf spot. Ala.
Heterodera marioni (Cornu) Goodey, root knot. Calif.

LACHENALIA (LILIACEAE)

LACHENALIA TRICOLOR Thunb., CAPE-COWSLIP. Bulbous herbs of South Africa grown as pot plants for ornament.

Mosaic -- virus (Marmor scillearum F. F. Smith & Brierley). Ala.

LILIUM (LILIACEAE)

LILIUM LONGIFLORUM Thunb., EASTER LILY. Flowering bulb of Japan and Formosa, grown chiefly under glass as pot plant and for cut flowers -- the principal forcing lily of commercial florists. Imported bulbs come mostly from Bermuda, Japan, and Formosa, are also grown commercially in Fla., La., Tex., Calif. and Ore. Some of the different forms have been characterized as species or botanical varieties (var. eximium Nichols, Bermuda lily, var. giganteum Hort., Japanese Easter l., var. insulare Hort., Erabu lily) but are not discriminated here.

Aphelenchoides olesistus (Ritz.-Bos.) (A. ritzema-bosi (Schwartz) Goodey, bunchy-top, dieback. Oreg., Wash., also in greenhouse stocks grown from bulbs originating in these States, in Md.
Botrytis cinerea Pers. ex Fr., Botrytis blight. Calif., Oreg., Wash.; probably cosmopolitan. B. elliptica (Berk.) Cke. is reported as the cause of Botrytis blight of Easter lilies in Fla., Me., and N.Y. Present information is insufficient to determine whether this is a distinct sp. as reported in America or belongs to B. cinerea in a broad sense.
Cercospora sp., leaf spot. Fla.
Colletotrichum lilii Plakidas, black scale rot. La., ? Miss.
Cylindrocarpon radicicola Wr., scale-tip rot (? secondary). Pacific Northwest.
Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Ga.

Lilium cont.

Fusarium oxysporum Schlecht. f. lilii Imle, Fusarium rot (bulbs, roots and stems). Gulf States.

Heterodera marioni (Cornu) Goodey, rootknot. Fla., Hawaii

Penicillium spp., blue mold of scales, dry rot of bulbs (typically in cold storage and associated with bulb mites). Cosmopolitan.

Phytophthora sp. (? P. parasitica Dast.), stump rot, top rot. N.J., N.Y.

Rhizoctonia solani Kuehn, stem canker. Calif., Ore., Wash.

R. tuliparum Whet. & J. M. Arthur, stem rot. Wash.

Rhizopus sp. (? R. stolonifer (Ehr. ex Fr.) Lind), soft rot of bulbs. Reported in Tex., probably cosmopolitan but less frequent on Easter lilies than on most garden types.

Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Conn., Fla.

Sclerotium rolfsii, southern blight. Fla., La., Ore.

Mottle, mild mosaic -- virus (several strains of Marmor tulipae Holmes, Tulipa virus 1 K.M.Sm., not typically those causing tulip mosaic). General in commercial stocks though often masked.

Necrotic fleck -- virus complex consisting of a symptomless virus, Adelonosus lilii Brierley & F.F.Smith, which is general in American and Oriental commercial stocks, together with certain strains of cucumber mosaic virus, Marmor cucumeris Holmes. Widespread in Oriental forcing stocks, occasional in domestic bulb stocks; eliminated in some by roguing for the cucumber virus component.

Rosette, yellow flat -- virus (Lilium virus 1 K.M.Sm.) Fla., in domestic stocks; also reported in Calif., La., Md., Mo., N.J., N.Y. in Bermuda and Oriental forcing stocks.

Yellow-top -- cause unknown, virus suspected. Ala., Fla., La.

LILIUM spp., "garden lilies". Flowering bulbs, mostly native to E. Asia (for American spp. cult. in gardens see the following section), grown for ornament chiefly in the open, i.e. hardy, some also flowered under glass for cutting. The principal spp. represented here are: L. AURATUM Lindl., GOLDBAND L. (1); L. CANDIDUM L., MADONNA L. (2); L.DAURICUM Ker-Gawl, CANDLESTICK L., including L. elegans Thunb. and var. batemanniae Hort., hybrid derivatives, (3); L. REGALE Wilson, REGAL L. (4); L. SPECIOSUM Thunb, SHOWY L. (5); L. TIGRINUM Ker-Gawl, TIGER L. (6); other spp. and hybrids (7).

Botrytis cinerea Pers. ex Fr. and B. elliptica (Berk.) Cke., Botrytis blight, leaf spot. General on all kinds of lilies, especially 1, 2, 5, 6; some spp. and vars. are appreciably resistant. The most frequent symptom, leaf spot or blotch, is associated with the fungus commonly identified as B.

Lilium cont.

elliptica which is morphologically distinguishable from B. cinerea occurring as a cosmopolitan saprophyte and facultative parasite on other hosts. The concept of the latter by some authors is sufficiently broad to include both spp. but its prevailing forms on lilies are at least physiologically distinct.

Cladosporium sp. (? C. herbarum Lk. ex Fr.), leaf and bulb-scale mold. Cosmopolitan.

Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot. Mass., N.J., ? W.Va. (2).

Colletotrichum liliacearum (Schw.) Ferr. (? C. dematium (Pers. ex Fr.) Grove), on dead stems. Reported from Md. (4); Ill., Me. (6), probably cosmopolitan.

Fusarium oxysporum Schlecht. f. lilii Imle, Fusarium rot (bulbs and juvenile plants). Occasional on most spp., especially 1, 2, and 5, less on 3, 4, and 6, in the Eastern, Southern, and Central States and Pacific Northwest. Some reports as Fusarium sp. perhaps relate to other forms or spp.

Kabatiella microsticta Bub., on leaves (? secondary leaf spot) Md., N.J., N.Y., Pa. (1, 2, 7)

Macrophomina phaseoli (Maub.) Ashby, charcoal rot of bulbs. Calif. On L. philippinense

Penicillium spp., blue mold of scales, sometimes dry rot of entire bulbs. Cosmopolitan, especially on bulbs that are cold-stored as 1, 3 and 5. P. cyclopium Westling and P. hirsutum Dierckx have been identified.

Phytophthora cactorum (Leb. & Cohn.) Schroet., stem rot, foot rot, Md. (2, 4, 5, 7); Minn. (2, 4); Mich., N.J., N.Car. (4); Minn., N.Y., Ohio, Wash., Wis. (7)

P. parasitica Dast., stem rot, top rot. Md., N.J., N.Y. (5); Ind. (7)

Pythium debaryanum Hesse, damping off. Ind. (4)

Rhizoctonia solani Kuehn, damping off of seedlings. Cosmopolitan. Stem rot, Conn. (1,2), Miss. (2), Minn., Ore. (5); Mass. (7)

Rhizobus sp. (? R. stolonifer (Ehr. ex Fr.) Lind.), soft rot of bulbs (usually in transit or storage). Cosmopolitan, especially on 1, 4, 5, 7

Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Conn. (2), Wash. (7)

Sclerotium relfsii Sacc. (S. delphinii Welch) southern blight. Conn., Ill., N.Y. (2); N.J., N.Y., Ore., Tenn. (4); Ind., Miss., N.Y., Pa. (7)

Sporotrichum sp., bud blight (? secondary). Va. (1)

Uromcyes holwayi Lagh. (0,I,II,III), rust. Conn., Mass., Mich., N.Y., Wash. (2)

Vermicularia liliacearum. See Colletotrichum.

Mosaic -- virus (in part Marmor tulipae Holmes, Tulipa virus 1

Lilium cont.

K.M.Sm., generally strains other than those causing typical tulip mosaic; in part Marmor cucumeris Holmes, Cucumis virus 1 K.M.Sm.). General in all spp. named and many others though some are resistant. The former virus is more prevalent; both are sometimes present. Symptoms range from completely masked to systemic chlorosis and necrosis, varying with the strain and host.

? Rosette, yellow flat -- virus (Lilium virus 1 K.M.Sm.) N.Y. (3). Various garden lilies including 1, 3, 4, 5 and others have been shown susceptible to this virus.

Chlorosis -- physiological, in part caused by iron deficiency. N.Y. (1, 5)

Crookneck -- not determined but virus suspected, perhaps a necrotic strain of Marmor tulipae. N.Y. (1)

Limberneck, ? topple (collapse of stem below inflorescence) -- cause unknown but believed physiological, perhaps associated with soft rapid growth and mineral deficiency. Md., Miss., N.J., N.Y., Wash. (1, 2, 4, 5, 7)

LILIUM spp., native lilies. Bulbous herbs of meadows and prairies, mostly in the Northeastern and North Central, and especially the Pacific Coast States; some of distinctive ornamental value and grown as garden lilies, as L. canadense L. (including L. michiganense Farwell) (1), in the Eastern and Central States; L. columbianum Hanson (2), Pacific Coast States, L. humboldtii Roez. & Leichtl. (3), in Calif.; L. pardalinum Kell. (4), in Calif. and Ore.; L. philadelphicum L. (5) and L. superbum L. (6), Eastern and Central States; L. washingtonianum Kell. (7), in Calif. and Ore.

Botrytis cinerea Pers. ex Fr., (? B. elliptica (Berk.) Cke.), Botrytis blight. Reported in Md., N.Y., Ore., Vt., Wash., probably general under humid conditions; noted on 1, 2, 3, 4, 6, 7.

Cercosporella lilii Dearn. (? C. inconspicua (Vint.) Hoehn.), leaf spot. Conn., N.Y. (1)

Fusarium oxysporum Schlecht. f. lilii Imle, Fusarium rot. N.Y. (4, 6), Va. (7)

Phytophthora cactorum (Leb. & Cohn) Schroet., stem rot. Md. (7)

Puccinia sporoboli Arth., (C,I), rust. On L. umbellatum Pursh in Nebr. and N.Dak. II and III on Sporobolus spp.

Ramularia sp., leaf spot. Wash.

Uromyces holwayi Lagh. (O,I,II,III), rust. Me. to N.J., Nebr., Minn. (1); Calif., Ida., Ore., Wash. (2); Wash. (3); Calif., Wash. (4); Ill., Mass., N.H., N.Y. (5); R.I. to Iowa and Minn. (6); Calif., Ore. (7)

Mosaic -- virus(es), commonly Marmor tulipae Holmes, Tulipa virus

Lilium cont.

1 K.M.Sm.; sometimes M. cucumeris Holmes, Cucumis virus 1 K.M.Sm., or both. Occasional on all these spp. when cultivated.

Limber neck -- physiological. N.Y. (3, 7)

DIVISION OF MYCOLOGY AND DISEASE SURVEY

NOVEMBER WEATHER

(From U.S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for the week ending December 3, 1946.)

Map I shows that the month of November 1946, averaged much warmer than usual over the eastern portion of the country, including the Mississippi Valley, and near to somewhat below normal in the far West. The plus anomalies exceeded 6° quite generally from Florida and Alabama northward over the Appalachian Mountain region and the Atlantic States to southern New England while temperatures averaged 4° or more below normal in Montana and northern Idaho.

The irregular distribution of total precipitation for the month of November 1946, is evident from Map II. Less than the usual amounts for the month were received in southwestern border districts, in the area from Michigan and Indiana eastward over the Appalachians and the Atlantic States north of North Carolina, and in Florida, North Dakota, and eastern Montana; elsewhere amounts ranged from near to considerably above normal.

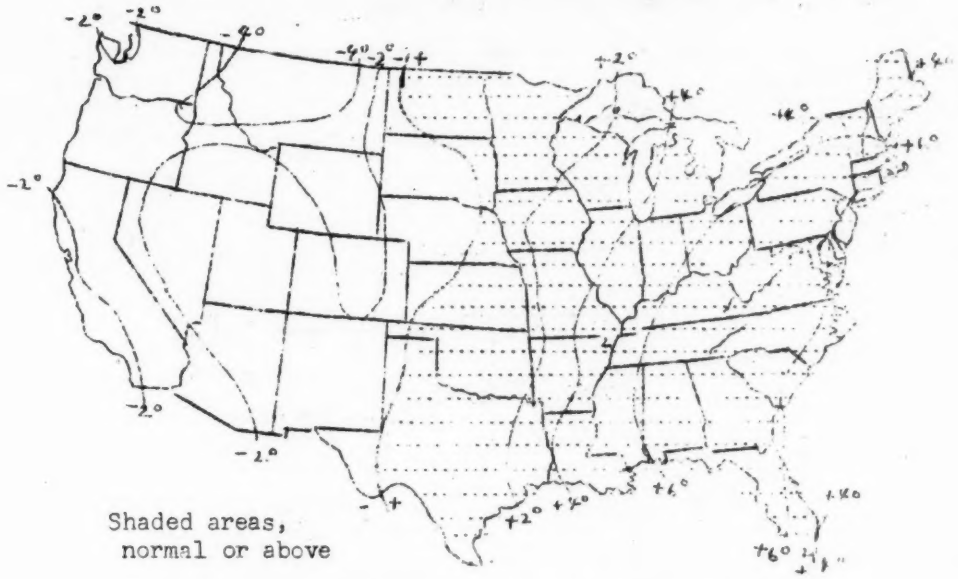
Less than half the usual precipitation for the month occurred in the area from northern Virginia to southern New England, in eastern Kansas central North Dakota, and the Rio Grande Valley, while totals were more than twice their normals in the area from east-central Texas to central Illinois and quite generally from Nebraska and western Kansas westward over the middle Rocky Mountain region, southern Great Basin, and southern California.

AUTUMN WEATHER

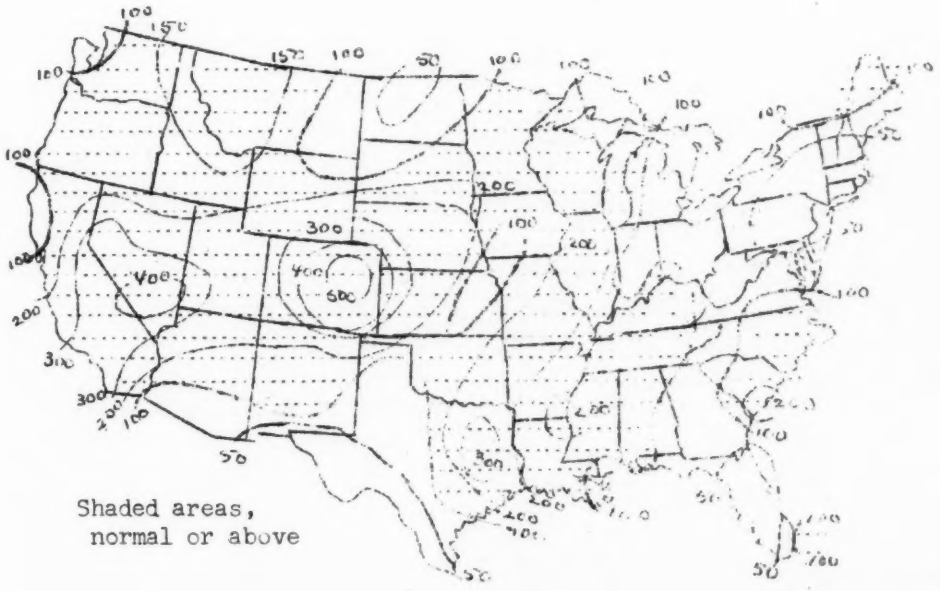
Map III shows that temperatures averaged much above normal during the past 3 months over the entire eastern portion of the country and the southern Plains, and near to somewhat below normal elsewhere. The plus anomalies exceeded 4° in the Northeast while the minus anomalies ranged from 2° to about 5° in the far Northwest.

Map IV presents the areal distribution of the percentage of normal precipitation for the past 3 months. It was drier than usual in southwestern Texas and in sections of eastern Kansas, northern Missouri, eastern and southern Florida, southeastern Georgia, on the north California coast, and quite generally from Lake Michigan, Indiana, and Kentucky eastward to the north Atlantic coast, except in northern New York.

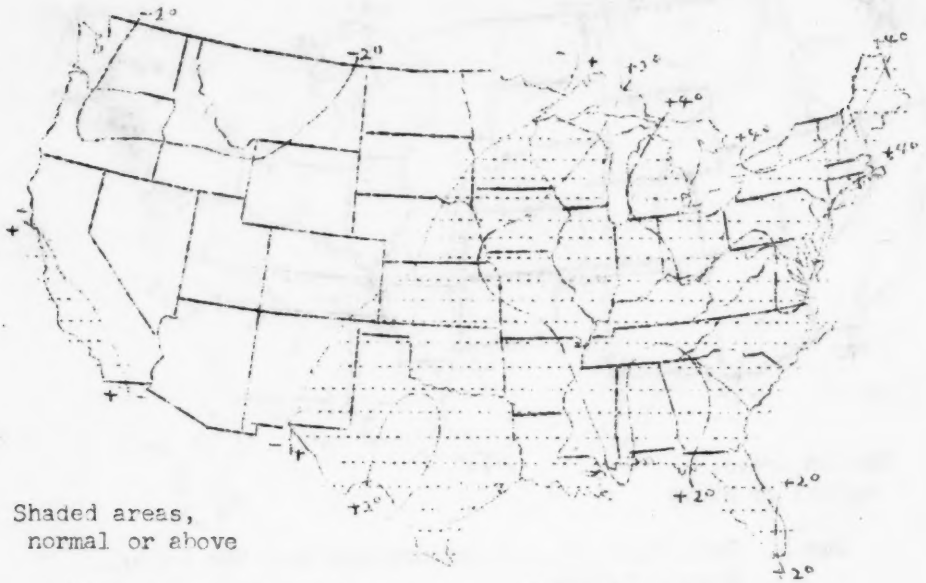
The remaining portions of the country received near to considerably more than the usual precipitation for the season. This was especially true in the central portion of the western Plains, the southern Great Basin, and sections of southern California where accumulations were more than three times their normals.



Map I. Departure of mean temperature from the normal, November 1946.



Map II. Percentage of normal precipitation, November 1946



Map III. Departure of mean temperature from the normal, Autumn 1946

Map IV. Percentage of normal precipitation, Autumn 1946